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Motives and Barriers to Cloud ERP Selection for SMEs: A Survey of Value Added Resellers (VAR) Perspectives

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Motives and Barriers to Cloud ERP Selection for SMEs: A Survey of Value Added Resellers Perspectives

BY

Michael Leigh Garverick

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree

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ACCEPTANCE

This dissertation was prepared under the direction of the Michael Leigh Garverick Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctoral of Philosophy in Business Administration in the J. Mack Robinson College of Business of Georgia State University.

H. Fenwick Huss, Dean

DISSERTATION COMMITTEE

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ABBREVIATIONS

List of Abbreviations (in Alphabetical Order)

ASP – Application Service Provider
BI – Business Intelligence
BPR – Business Process Re-engineering
CloudERP – Vendor of cloud ERP software whose VAR's are surveyed in this current study
CRM – Customer Relationship Management
CSF – Critical Success Factor
DOI – Diffusion of Innovation
DV – Dependent Variable
ERP – Enterprise Resource Planning
IaaS – Infrastructure as a Service
IS – Information Systems
ISP – Internet Service Provider
IT – Information Technology
IV– Independent Variable
MRP – Materials Requirement Planning
NIST – National Institute of Standards and Technology
OM – Operations Management
PaaS – Platform as a Service
RBV – Resource Based View
RDMS – Relational Database Management System
ROI – Return on Investment
SaaS – Software as a Service
SCM – Supply Chain Management
SMB – Small to Mid-size Business
SME – Small to Mid-size Enterprise
SOA – Service-Oriented Architecture
SOP – Subscription On Premise
TAM – Technology Acceptance Model
TCO – Total Cost of Ownership
UF – Unified Framework of Motives and Barriers of Cloud ERP Adoption
VAR – Value Added Reseller
Y2K – Year 2000

ABSTRACT

Motives and Barriers to Cloud ERP Selection for SMEs:
A Survey of Value Added Resellers Perspectives

BY

Michael Leigh Garverick

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Small to Mid-size Enterprises (SMEs) typically are slow/late to adopt new technologies due to a conservative bias, cost factors and possible lack of knowledge. Implementation of a new Enterprise Resource Planning (ERP) system is a major, costly undertaking for a company of any size, especially SMEs, but there is the potential for huge paybacks touted by advantages afforded by the cloud. Cloud based ERP technology for SMEs is relatively new and poses a potential large risk-reward payoff. Given that these SMEs are currently functioning with their existing systems, why would they want to risk switching to "Bleeding Edge" Cloud ERP technology?

Prior ERP research has focused primarily on an ERP's implementation success and the relevant critical success factors (CSFs) important throughout the various stages of an ERP's lifecycle. The focus of these studies has been on post-selection variables and the success or failure of the ERP's adoption or implementation. Inherent in these studies are firms who already selected ERP technology which provides no insight into any potential barriers that prevent selection.

ERP research in the area of SME cloud/SaaS ERP systems is nascent. This paper adds methodological, empirical and theoretical contributions to this existing stream of research about the motives and barriers in the selection of cloud ERP systems for SME's. In particular, this research paper proposes to help bridge these gaps by operationalizing and testing Saeed, Juell-Skielse, and Uppström (2012)'s Unified Framework (UF) of the motives and barriers to the selection of cloud ERP systems. This current study uses Value Added Resellers (VARs) as subjects. They are arguably the most knowledgeable and in the best position to assess both the motives and more importantly barriers since there are in direct contact with the cloud ERP prospective purchasers.

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1   Introduction

Initial ERP systems evolved out of Materials Resource Planning (MRP and MRP II) systems from the 1970's and 1980's which were run on large mainframe computers. MRP/II systems were used to plan and calculate inventory and other value chain requirements based on a company's forecasted sales and calculated needs of materials and resources (based on a Bill of Materials) to meet demand. ERP evolved from the MRP/II systems and came into existence in the late 1980's and early 1990's as computer hardware and software became more powerful and allowed for other stand-alone systems to communicate and share information with one another across one common database (see Figure 1 (Rashid, Hossain, & Patrick, 2002, p. 4)).

Figure 1: Evolution of ERP (Rashid et al, 2002)

2000s	**Extended ERP**	
1990s	**Enterprise Resource Planning (ERP)**	
1980s	**Manufacturing Resources Planning (MRP II)**	
1970s	**Material Requirements Planning (MRP)**	
1960s	**Inventory Control Packages**	

This included extension to and integration with accounting systems to close the loop on the procurement (purchasing, accounts payables) and fulfillment (sales, accounts receivable) processes as well as other stand-alone systems (e.g., general ledger, Customer Relationship Management (CRM), etc.; see Figure 2 ((Davenport, 1998, p. 124))).

Figure 2: Anatomy of an ERP (Davenport, 1998)
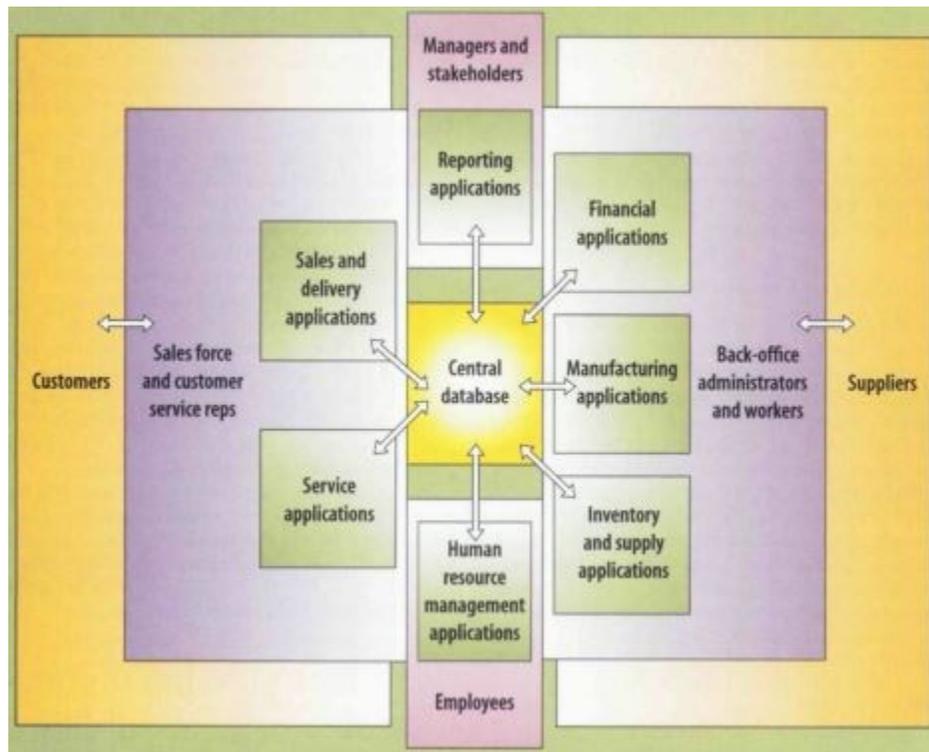
It was during the 1980's and early 1990's that powerful relational database management systems (RDMS) began to surface that allowed for such integration of previously independent systems. Also, to help push ERP systems into the mainstream was the increase in computing power and the advent of client/server networked computer systems where some of the computer processing tasks could now able to be offloaded onto and shared with client workstations (which was previously impossible with the "dumb" terminals that were hooked up to mainframe systems). Lastly, if companies had not jumped on the ERP bandwagon by this time the infamous problems associated with the "Year 2000" (Y2K) data storage and processing/calculation issues had forced many companies off of their home-grown, custom, proprietary systems and forced them into the modern era of ERP. Rashid et al. (2002), p. 1 "ERP systems are now ubiquitous in large businesses and the current move by vendors is to repackage them for small to medium enterprises (SMEs)". Prior to Y2K, other smaller ERP vendors had already been catering their

software to the SME market as well, although the penetration rate was not near that of the larger companies due to the smaller Information Technology (IT) budgets of the SME businesses and their perceived need for such systems was lower.

The basic definition of ERP is an "enterprise-wide information system designed to integrate and optimize the business processes and transactions throughout an entire organization (Addo-Tenkorang & Helo, 2011, p. 1). Developments in technology (e.g., the internet, web related software, cell phones, tablets, hardware, social media, eCommerce, etc) have led to "Extended ERP" (ERP II and ERP III), which transcends the boundaries of the organization. ERP II applications extend supply functionality to external enterprises (generally vendor-affiliated companies) to reduce cost, improve supply chain efficiency, and to perform collaborative innovation while ERP III enterprises go to the next level to include customers and the sales side of the marketplace into enterprise operations where customers become active participants in a firm's business (Wood, 2010). In addition, many "add-ons" are available from third-party vendors or system integrators to enhance the capabilities of the ERP systems.

Enterprise Resource Planning (ERP) systems are usually the largest, most complex, and most demanding information systems implemented by firms (Grabski, Leech, & Schmidt, 2011, p. 37). "ERP systems can provide great rewards, but the risks they carry are equally as great" (Davenport, 1998, p. 128). The literature has documented a high implementation failure rate of ERP implementations of up to 70% (Al-Mashari, 2000), some to the extent of causing bankruptcy of the company. "An enterprise system, by its very nature, imposes its own logic on a company's strategy, organization and culture" (Davenport, 1998, p. 122). ERP systems will not improve an organization overnight. Most ERP systems implementations will require some degree of customization and are overall very disruptive to the organization. "The high expectation of achieving all-round cost savings and service improvements is very much

dependent on how good [well or closely] the chosen ERP system fits to the organizational functionalities and how well the tailoring and configuration process of the system matched with the business culture, strategy and structure of the organization" (Rashid et al., 2002, p. 5).

In summary, technological change is inevitable. The initial invention of the computer in the form of mainframe systems allowed organizations to digitize some of their old, archaic, manual, paper-based systems. Separate, disparate systems developed and evolved within companies to perform specific or specialized tasks and functions in isolation. Eventually MRP/II finally evolved to help companies manage their warehouse planning and requirements. Along the same lines, companies developed their own in-house, proprietary systems to help run specific aspects of their businesses. The increase in computing power and technological capabilities led to advances in RDMS and the proliferation of client/server networks and personal computers. This led to larger companies initially adopting ERP systems. Environmental factors such as Y2K issues increased the adoption of ERP systems for both large and SME's due to the risk of their existing systems not working. The internet has led to ERP II and ERP III, extending the ERP system outside corporate boundaries to interact with vendors and customers in the value chain. Now a new technology, "cloud computing" has become more prevalent and pervasive. With the growth of the internet and cloud computing, cloud based ERP technology has emerged as a promising alternative for companies to choose for their ERP systems.

1.2   Background

1.2.1   Motivation for the Study

Over the past fifteen years the landscape of computing has been through significant changes, initially with the Y2K scare forcing a lot of businesses of all sizes to switch to Y2K compliant ERP systems. The investment in and implementation of an ERP system is typically the largest, most pervasive and often painful systems endeavor a company endures. Technology

keeps changing at a rapid pace. Similar to older automobiles, client-server technologies from the

Y2K era or initial ERP systems implementation are eventually going to become outdated,

unsupported and in need of an upgrade or change. The emergence of mobile technologies such

as cell phones, tablets, etc., combined with more geographically disbursed workforces, global

competitiveness and need for more current information has caused a change in the way

companies need to deliver information in a faster, quicker, more economical manner.   In

addition, these information consumers now extend beyond the barriers of the corporate

employees, to external business partners, vendors, customers, and even the public or social

media. Will companies choose to enhance their existing ERP systems, by upgrading them and/or

adding/integrating additional software components to meet the growing needs or will this new

cloud computing technology cause a shift in companies decisions to switch to more current cloud

based ERP technology? If cloud computing is supposed to be the next best thing since sliced

bread, will companies be willing to go through another major, painful, costly and risky systems

implementation to keep up with the "bleeding edge" of technology?

1.2.2   Significance of the Study

In the past, adoptions of new technologies have been studied using theories such as the:

(1) Technology Acceptance Model (TAM) (Davis (1989), Venkatesh, Morris, Davis, and Davis

(2003)), see Figure 3:

Figure 3: Technology Acceptance Model (TAM)
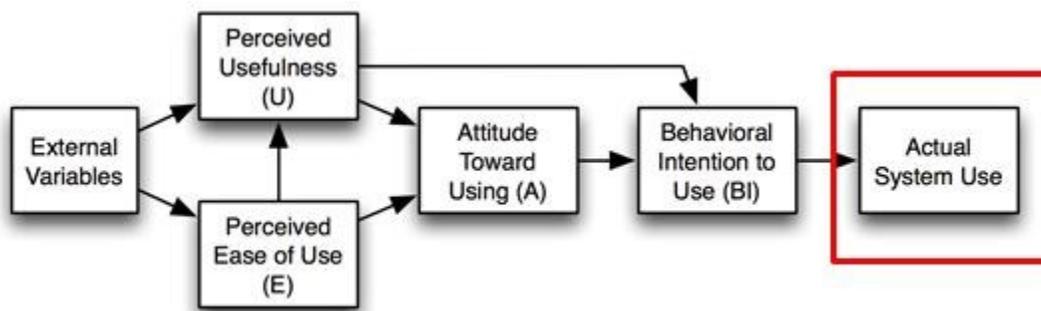
(2) Diffusion of Innovation (DOI) (Agarwal & Prasad, 1998; Cooper & Zmud, 1990; Crum,

Premkumar, & Ramamurthy, 1996); see Figure 4:

Figure 4: Diffusion of Innovation (DOI) Model
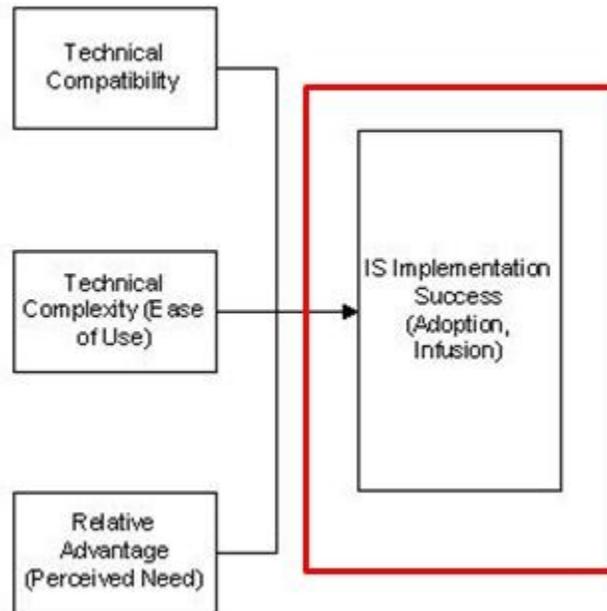
(3) Information Success (IS) Model (Delone, 2003; DeLone & McLean, 1992); see Figure 5:

Figure 5: IS Success Model
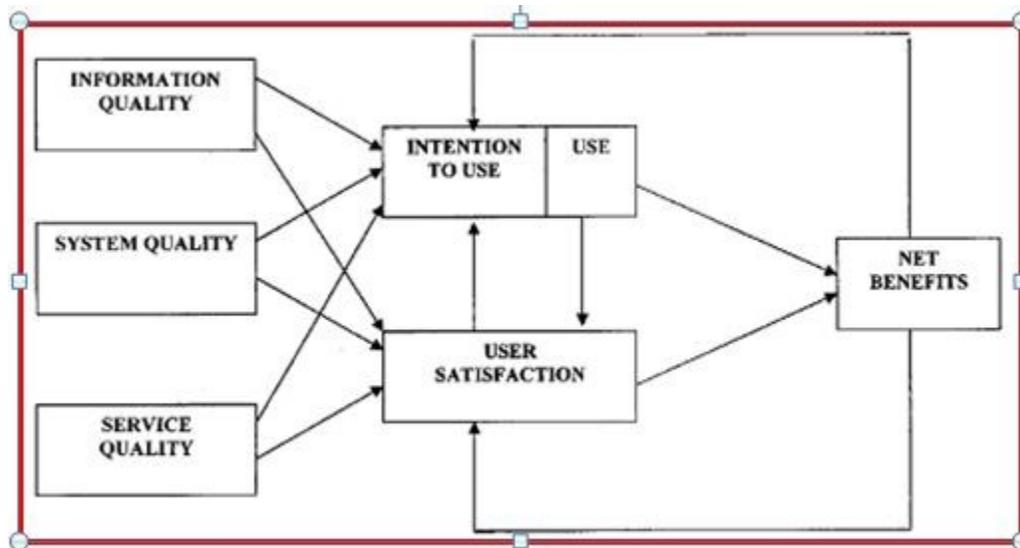
(4) Marketing Satisfaction Model applied to Application Service Providers (ASP) (Susarla,

Barua, & Whinston, 2003); see Figure 6:

Figure 6: Marketing Satisfaction Model
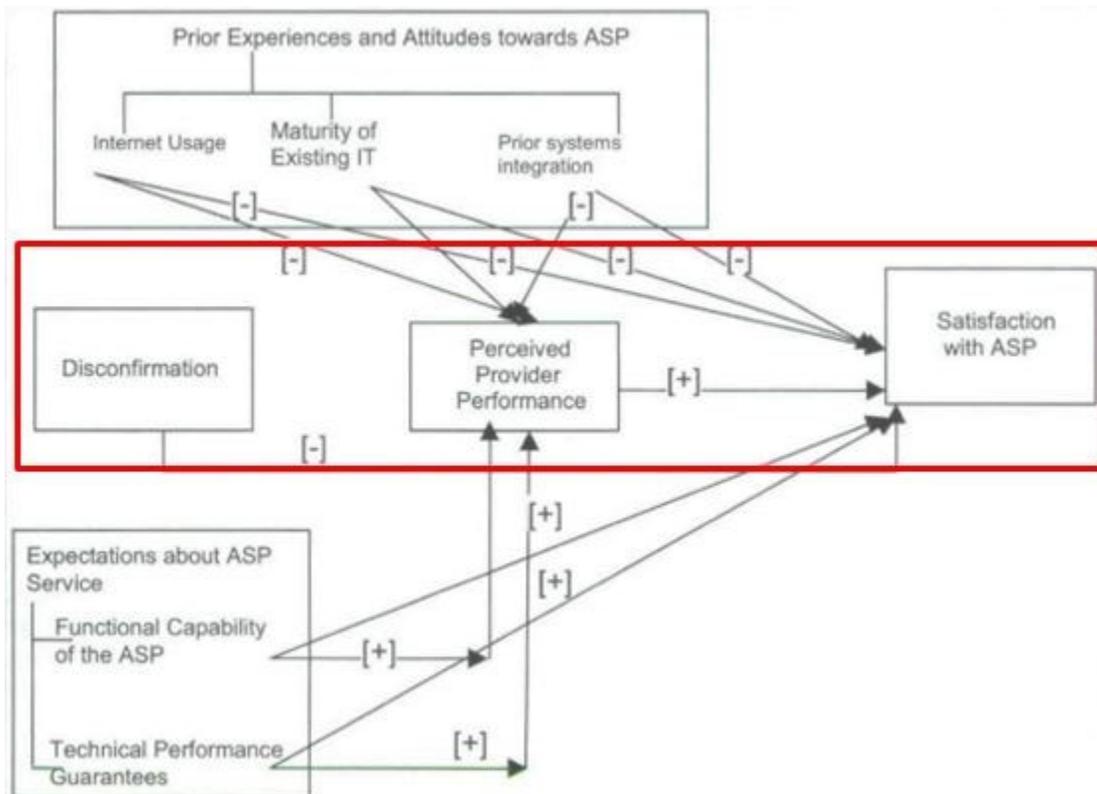
These are the predominant models used in the IS literature to study the adoption of a wide

variety of technologies. If applied to ERP adoption, each of these models presumes purchase of

the ERP system to measure the impact of some independent variables (IV's; e.g., CSF's) and

their impact on a dependent variable (DV) from one of the models specified (e.g., Satisfaction,

Implementation Success, etc.). These variables (the red boxes outlining variables above in

Figure 3 through Figure 6) would have to be measured post ERP selection decision. Thus,

implicit in these models is the fact that the given ERP system has been selected or purchased.

These variables highlighted in the models may have little relation to the actual selection decision

process and criteria since their success (or outcome) dimension relies on post-selection factors

that may not be related to the selection criteria (e.g., quality of service provider, estimate of project budget, quality of software, etc.). Thus, we would be looking at DV measures that most likely have been influenced by other variables or factors introduced post system selection. In addition, these models would be only looking at "adopters" who decided to select (purchase or adopt) the software. By using these models we would never get any feedback or measurement of potential barriers to selection by "non-adopters" (lost customers) who chose not to purchase the ERP system.

To address this issue, this current study uses Value Added Resellers (VARs) as subjects in the study. VARs have the expertise, experience and are in contact with both prospects (who turn into customers or purchasers) and non-purchasers during the sales cycle. Arguably, the VARs are in the best position to evaluate and provide feedback about ***both the motives as well as barriers*** to the Cloud ERP selection decision.

Fichman (2004) discusses the "Dominant Paradign for IT Innovation" (see Figure 7 below). He states that "the ultimate outcomes or benefits of innovation with IT are rarely considered in studies within the dominant paradigm. No doubt the difficulty of measuring impacts has played a role in this, however another important reason is the well known pro-innovation bias, which refers to the assumption that innovations are beneficial" (Fichman, 2004, p. 317).

Figure 7: The Dominant Paradigm for IT Innovation
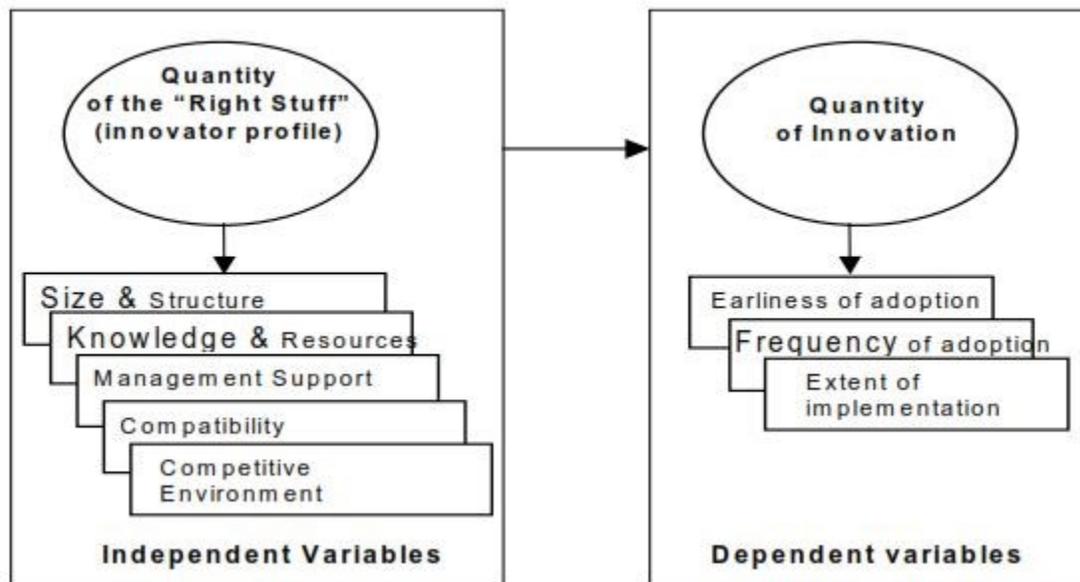
Jeyaraj, Rottman, and Lacity (2006) review the research on the adoption and innovation of IT-based innovations by both individuals and organizations. One of the prescriptions they provide for overcoming the "adopter bias" is to increase the study of non-adopters. Although the current study will not directly observe or get feedback of the non-adopters, using VARs as subjects will hopefully provide more feedback about barriers than traditional adoption studies. A practical outcome of this current study is to develop a competitive win-loss analysis and feedback process with the CloudERP company to collect information directly from non-adopters as well as the VARs about each particular lead's win/loss scenario.

1.3   Theoretical and Conceptual Framework

The stream of ERP systems research is very mature but reviewers have identified a few particular research areas that are consistently cited as lacking throughout the literature relating to research applicable to SMEs, a lack of theory, and a need for research into cloud-based applications and/or SaaS offerings (Addo-Tenkorang & Helo, 2011; Grabski et al., 2011). Prior ERP research has focused primarily on an ERP's implementation success and the relevant

critical success factors (CSFs) important throughout the various stages of an ERP's lifecycle (Addo-Tenkorang & Helo, 2011; Grabski et al., 2011; Schlichter & Kraemmergaard, 2010). The focus of these studies has been on post-selection variables and the success or failure of the ERP's adoption or implementation. Inherent in these studies are firms who already selected ERP technology, which provides no insight into any potential barriers that prevent selection. Also, the dependent variable (DV) in these studies has typically been the success of the implementation or customer satisfaction which is heavily influenced by a multitude of CSF's and other factors that may not reflect the actual criteria (or motives) used for the selection decision. This current study adds methodological, empirical and theoretical contributions to this existing stream of research about the motives and barriers in the selection of cloud ERP systems for SME's.

With respect to a theoretical perspective, this current study operationalizes and tests the "Unified Framework of Motives and Barriers of Cloud ERP Adoption" (UF hereafter) put forth by Saeed et al. (2012). This current study is grounded in a literature review and uses interviews with industry experts (other industry VARs and executives from CloudERP, the company whose VARs we will be surveying) to assess the face validity and content validity of the UF. Unique to this current study is using VARs as subjects in order to provide better insight into the barriers that are preventing the prospective buyers from not selecting to purchase cloud ERP technology.

As previously mentioned, prior studies have focused on measuring post-adoption variables of interest. This (a) by definition (since the ERP product has been purchased) misses capturing barriers to the purchase decision, and (b) results in typically measuring variables that have been affected by many other post-selection factors unrelated to the motives that drove the selection decision. This current study tests components of the constructs of "motivations" as

well as a "barriers" to cloud ERP software selection for SMEs as presented in the UF. The

research questions addressed by this current study are:

- What factors are motivators for the selection of Cloud ERP for SMEs?, and

- What factors are barriers to the selection of Cloud ERP for SMEs?

Specifically, this research modifies the UF and tests the components of the motives and

barriers of the modified UF. This study's expert VARs dropped one motive as it was not

relevant to the CloudERP business model. Additionally, three barriers were dropped from the

original UF due to being as a no longer relevant in the current market environment. These three

dropped barriers with three new barriers. Results of the study show support for all seven motives

of the modified UF, whereas only three out of the eight barriers are supported. Note that two out

of the three barriers that were significant were barriers added by the content and face validity

checks performed with expert VARs. These results suggest that the "wave" of cloud ERP

technology is developing rather quickly and becoming more mainstream. The original Saeed et

al. (2012) UF framework is less than two years old and already is becoming somewhat out of

date as assessed by our experts and supported by the results of our survey.

1.4   Summary

This chapter provides an introduction and background to Cloud ERP and motivation for

the study. It also introduces the UF theoretical framework that is tested, as well as the research

methodology used, and the research questions that are addressed. The following chapters of this

dissertation provide support for the arguments stated above, describe the research methodology

used, as well as discuss the results and findings of the research:

- **Chapter CHAPTER 2: LITERATURE REVIEW.** This chapter presents a relevant
  review of ERP and Cloud streams of literature. The ERP literature is very mature and
  expansive so key review papers are relied upon as the basis for a summary. At the other

extreme, Cloud research is in its infancy. In both of these areas a special section addresses research that is focused specifically on SMEs.

- **Chapter CHAPTER 3: CLOUD ERP SELECTION FRAMEWORK.** This chapter reviews the UF presented in Saeed et al. (2012), listing the components and descriptions of the individual components of the motives and barriers of Cloud ERP selection.

- **Chapter CHAPTER 4: RESEARCH METHODOLOGY.** This chapter details the steps involved in designing the final questionnaire, including expert reviews of the UF to provide face and content validity checks. This chapter also outlines the data collection strategy.

- **Chapter CHAPTER 5: RESULTS.** This chapter provides analysis of the data, including statistical test results (when applicable).

- **Chapter CHAPTER 6: DISCUSSION.** This chapter discusses the major contributions from the study, with supporting results from the previous chapter.

- **Chapter CHAPTER 7: CONCLUSION.:** This final chapter discusses the limitations of the study. It also discusses directions and recommendations for future research.

CHAPTER 2: LITERATURE REVIEW

2.1   ERP Literature

ERP research was in its infancy in the mid- to late-nineties. Esteves and Pastor (2001)

list several articles from 1997 conference proceedings while Davenport (1998) was the first

mainstream article. The stream of research has matured in a relatively short period of time,

peaking at 131 articles in the year 2005 and steadily declining to a total of only 13 articles in

2010 (Addo-Tenkorang & Helo, 2011, Fig. 1).   Nine key review papers were identified spanning

various timeframes, some overlapping eras, some using different inclusion strategies and

categorization methodologies (see Table 1: ERP Review Papers).

Table 1: ERP Review Papers

ERP Review Papers			
Author (Year)	# Papers Reviewed	Time-Span	Frame
Esteves and Pastor (2001)	189	1997-2000	Annotated bibliography and categorization by ERP life Cycle stage
Shehab, Sharp, Supramaniam, and Spedding (2004)	76	1990-2003	Selection/implementation
Botta-Genoulaz, Millet, and Grabot (2005)	80	2003-2004	Identifies six areas of research
Cumbie, Jourdan, Peachey, Dugo, and Craighead (2005)	49	1999-2004	Implementation/operation/benefit
Esteves and Bohorquez (2007)	640	2001-2005	Life Cycle
Moon (2007)	313	2000-2006	Categorizes papers into six major themes plus sub-themes
Schlichter and Kraemmergaard (2010)	885	2000-2009	Topic/discipline/method
Addo-Tenkorang and Helo (2011)	154	2005-2010	Categorize papers into ERP System Life Cycle (SLC) six major and sub phases
Grabski et al. (2011)	Not Specified	Prior to 2011	AIS focused taxonomy of three major research areas and sub areas

The first review paper from 2001 (Esteves & Pastor, 2001) analyzed 189 publications from ten IS journals and eight IS conferences, with only a small number from journal publications (21) while the rest were from conferences. Research up through this point (1997-2000) mainly focused on the implementation phase and related issues. The authors concluded that ERP systems research should become interdisciplinary instead of just IS focused. In the following years ERP research flourished. Due to the vast number of articles and topics addressed, this paper will provide a summary of the categorization provided by the remaining review articles and emphasize the particular areas and papers mentioned that address the main concern of this research study, the ERP software selection process and SMEs.

Shehab et al. (2004) provides an overview of ERP systems, followed by an outline of ERP evolution, then proceeds into major ERP vendors and the main drawbacks of their systems and also has a section on implementation approaches and factors influencing the implementation process. Shehab et al. (2004) state that the deployment of ERP can be divided into selection and implementation. A section of their article called "Selection Criteria of an ERP System" is presented in Table 2: ERP Selection Criteria (from (Shehab et al., 2004, Table II p. 372)) below. This shows a list of the papers that they selected on the topic and various selection factors considered.

Table 2: ERP Selection Criteria

Author(s)	Type and field of study	Size of organisations	Selection factors considered
Siriginidi (2000)	Theoretical	Large size	Stability and history of the ERP supplier Last 12-month track record of ERP sales Implementation support from suppliers Improvement in ERP packages including stability of the product and functionality
Bernroide and Koch (2001)	Empirical Austrian	Mid and large size	Implementation time Adaptability and flexibility of software Costs Vendor support Team size and structure Market position of vendor Customer and supplier needs
Everdingen et al. (2000)	Empirical European	Midsize	Fit with business process Flexibility User-friendliness Costs Scalability Supplier support and training Product functionality and quality Implementation speed Interface with other systems Price Market leadership Corporate image and international orientation
Sprott (2000)	Theoretical	Large size	Applicability Integration Adaptability Upgradability
Chen (2001)	Theoretical	Large size	Competitive strategy Targeted market segments Customer requirements Manufacturing environment Characteristics of the manufacturing process Supply chain strategy and available resources
Rao, 2000	Theoretical	SMEs	Affordability Domain knowledge of suppliers Local support Technical upgradable Incorporation of latest technologies
Verville and Halingten (2002)	Empirical USA	Large size	Vendor evaluation Functional and technical aspects of the software

Botta-Genoulaz et al. (2005) analyze 80 papers over a two year span (2003-2004) on the basis of classification into six categories: Implementation of ERP, Optimization of ERP, Management through ERP, the ERP Software, ERP for Supply Chain Management, and Case Studies. They conclude that although ERP research is still growing, it has reached some maturity while noting a growing interest in the post-implementation phase of ERP project, ERP customization, the sociological aspects of implementations, interoperability of ERP and other systems and on the return on investment (ROI) of ERP implementations.

Cumbie et al. (2005) analyzed 49 articles over a five year span (1999-2004) from top Information Systems (IS) and Operations Management (OM) fields. The categorize research topics into three areas of ERP: Implementation, Operation and Benefits. They further divide the

articles by research strategies or methodology within the three research topics. Qualitative field studies were the overwhelming chosen research method, being used in 23 of the 49 articles. Surveys were next closest with 13 followed by 10 Theory/Literature reviews. They concluded that ERP research in 2005 was still exploratory in nature as evidenced by their breakdown of research strategies.

Esteves and Bohorquez (2007) looked at 640 articles from 23 IS journals and ten IS conferences from a five year span (2001-2005) and categorized them through an ERP lifecycle based framework that is structured in phases. The breakdown of publications was 25 focusing on adoption, 15 on acquisition, 207 on implementation (primary focus with over 32% of articles), 68 on usage, 59 on evolution, 35 on education and 40 were classified as general. They conclude by stating that ERP systems are pervasive by nature and the topic lends itself to a wide range of fields outside of IS and that research on the topic could or should be interdisciplinary.

Moon (2007) classifies 313 articles from 79 journals to try and understand what types of ERP research questions that have been addressed and categorizes them by the following six research topics: Implementation of ERP, Optimization of ERP, Management through ERP, The ERP software, ERP for supply chain management, and Case studies (similar to Botta-Genoulaz et al. (2005)). Again, implementation was by far the largest represented category with over 40% of the articles. He also divides these major themes into sub-themes. One of the sub-themes of interest under the Implementation stage is the "Focused Stage" which includes articles that cover adopting company's entire ERP life-cycle from the decision to "go for it" to the final "go live" stage. In this "Focused Stage" there are only 12 articles involving the selection process ((Bernroider & Koch, 2001), (Stefanou, 2001), (Verville & Halingten, 2002b), (Verville & Halingten, 2002a), (Bryson & Sullivan, 2003), (Verville & Halingten, 2003a), (Verville & Halingten, 2003b), (Wei & Wang, 2004), (Luo & Strong, 2004), (Wei, Chien, & Wang, 2005),

(Baki & Çakar, 2005), and (Verville, Bernadas, & Halingten, 2005)) that will be addressed in Section 2.1.1 Selection Articles.

Schlichter and Kraemmergaard (2010) studied 885 peer-reviewed publications from 2000 to 2009 with the goals of understanding the current state of ERP research and also to develop a conceptual framework identifying areas of concern with regard to ERP systems. They find that ERP research is an interdisciplinary field and that the number of ERP publications has decreased (peaking with 116 articles in 2003 and decreasing to 66 articles in 2009) signaling that it is a mature research field. They identified eight areas of concern and list relevant issues in each area: (1) Implementation, (2) Optimization and post-implementation, Management and organization, (4) the ERP tool, (5) Supply Chain Management and ERP, (6) Studying ERP, (7) Education and Training, and (8) Market and Industry. They study states that the topic of implementation of ERP is the most studied topic accounting for 29 percent of the papers that they reviewed. They also found that case studies have been the most used method (22 percent) but that in the later years this research method was declining at the expense of surveys, with a larger proportion of survey studies eclipsing case studies starting in 2006.

One of the relevant issues listed under "Implementation" area of concern was "Which criteria should be used in selecting the ERP system, e.g., how well does the ERP system fit the business strategy" (Schlichter & Kraemmergaard, 2010, p. 510). They cited two papers, (Wei et al., 2005) and (Wei & Wang, 2004)) which relate to ERP selection and will be addressed in Section 2.1.1 Selection Articles.

Lastly, Schlichter and Kraemmergaard (2010) analyze the various theoretical lenses used to analyze a specific aspect of ERP, Business Process Re-engineering (BPR). Of the 20 papers they analyzed, CSF's was the dominant lens used in eight of the twenty papers. Formal business modeling, connectionist model, innovation processes, organizational sociology, change

management, supply chain theory, object orientation, organizational memory and adoption

models are all the other "theoretical lenses" listed (some of these sound like a stretch to be called

"theoretical lenses", sounding more like categorization or classification methodologies than

theories).

Addo-Tenkorang and Helo (2011) provides a more recent picture of the ERP research

using a similar categories as Moon (2007). The research category of "Implementing ERP" is

most pervasive (54% of articles in this review) since it can potentially allow a company to

manage its business better and provide all the touted benefits of improvements in information

quality, integration, coordination, planning, control, SCM, customer service, etc. (Gattiker &

Goodhue, 2005). On the flipside is the numerous failed implementations that are often reported.

They divide subtopics of implementation into 'General' (describe implementation practices and

approaches, models, methodologies, various difficulties/issues encountered, etc), 'Case Studies'

(describing implementation experiences at one or several companies), CSF's (popular topic

although many inconsistent and inconclusive findings), 'Change Management' (including BPR

efforts), 'Focused Stage' (addressing particular stage of ERP implementation life-cycle), and

'Cultural Issues'.

The next major topic (Addo-Tenkorang & Helo, 2011) addresses is ERP

Exploration/Uses. The subtopics explored in this category are 'General' (user acceptance,

satisfaction, post-implementation BPR, uncertainty management, process management,

legal/accounting requirements, upgrades/migration, political roles, operational capabilities),

'Decision Support Systems' (Business Intelligence (BI), forecasting/planning/control of

operations), 'Focused Function' (accentuating the efficient exploration of ERP systems in

specific areas such as manufacturing, marketing, accounting, production, project management,

operations, etc.), and 'Maintenance' (keeping system up and running). Other major topics

include Extension (providing functionalities beyond the original ERP system (ERP 2.0 or 3.0)
including e-Business/Commerce, SCM, CRM, BI, Service-oriented Architecture (SOA),
Software as a Service (SaaS), etc), Value (what are the benefits, how to measure value, market
reactions, cost/benefit, ROI, etc.), and Education/Training (IT skills, end users at various stages,
students).

In their "Trends and Perspectives" and "Analysis" sections Addo-Tenkorang and Helo
(2011) provide several key recommendations supporting the importance of this studies topic.
Regarding SaaS they state that this "model is of much interest when researching the future of
ERP systems…but there seem to be not much academic research published within this area yet."
They further discuss SaaS by stating that "this future delivery model might change the current
ERP systems value-chain…and very well could include hybrid SaaS solutions where the
distributors offer the customized SaaS solutions to the end customer." They discuss an
interesting question of examining how SaaS-based ERP systems delivery meet [change] the
business IT needs of organizations including the small and mid-sized and what the implications
are for the ERP value chain of switching from perpetual licensing (purchasing) to SaaS offerings.
The mention using the Resource Based View (RBV) and the perspective of core competencies as
theoretical lenses to offer interesting perspectives into the value chain issue mentioned above.
Lastly, they specifically state that the topic of "ERP in SMEs…[is an] area lacking in ERP
research and development."

Grabski et al. (2011) state that "early [ERP] research consisted of descriptive studies of
firms implementing ERP systems. Then researchers started to address other research questions
about the factors that led to successful implementations: the need for change management and
expanded forms of user education, whether the financial benefit outweighed the cost and whether
the issues are different depending on organizational type and cultural factors." The authors point

out that the prior research encouraged the development of several major ERP research areas (see

Figure 8 below (Grabski et al., 2011, Fig. 1, p. 39)): (1) CSFs, (2) the Organizational Impact, and

(3) the Economic Impact of ERP systems.

Figure 8: Grabski ERP Research Overview

Grabski et al. (2011) also calls for research in differing needs for large firms and SMEs,

research in the differences in the ERP technology base (e.g., SaaS and cloud-based applications)

versus traditional in-house ERP, research into ERP expanding beyond the organization to

upstream and downstream supply chain partners. Lastly, they call for more theory to be injected

into the research: "Unfortunately, much of the research (such as the large number of papers on

CSFs) has been survey-based, without strong underlying theory…unless a research paper is

following a design science methodology or grounded theory building approach, a strong

theoretical development and rigorous research design need to be utilized" (p. 64).

Overall, the stream of ERP systems research is very mature and reviewers have traced

common themes that have developed over the last fifteen plus years. A few particular research

areas that have been consistently cited as lacking throughout these papers are research applicable

to SMEs, a lack of theory, and a need for research into cloud-based applications and/or SaaS

offerings. This research paper proposes to help bridge these gaps by using a survey with VARs of CloudERP to test the constructs of motives and barriers presented in the UF.

2.1.1 Selection Articles

The selection[1] articles mentioned in the ERP Literature review under both the Moon (2007) and Schlichter and Kraemmergaard (2010) papers were numerous. I added several other traditional ERP selection review articles to this list and succinctly summarized them in Table 35 in Appendix A – Additional ERP Selection Papers (note that the table does not duplicate any of the articles that also appear in Table 2 from Shehab et al. (2004)).

Kamhawi (2008) is the only traditional ERP study located that looked at barriers to ERP adoption. The study investigates the motives adopted, benefits realized and barriers faced in the adoption and non-adoption of ERP systems in Bahrain. Kamhawi (2008) uses a survey based on prior studies and get responses from 16 adopter firms (40 usable questionnaires) and 37 non-adopter firms (51 usable questionnaires). The list of barriers for not adopting traditional ERP systems in large Bahrainian firms is shown in Table 3 below (from (Kamhawi, 2008, Table VI, p. 323)), along with the means and significance levels. "Requires large capital investments", "Require too much training for employees" and "We have more important priorities now" are all significant.

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[1] "Selection" refers to factors considered, decisions processes used and system and organizations characteristics affecting the choice of an ERP system.

Table 3: Table VI from Kamhawi (2008)

Reasons		Mean	SD
1	Requires large capital investments	3.69**	0.8
2	Implementing ERP systems will require too much training for employees	3.52**	1.1
3	We have more important priorities now	3.42*	1.2
4	No need now for the drastic change that ERP systems require	3.25	0.9
5	We lack the experience needed to develop and support ERP systems	3.17	1.0
6	It would be difficult to integrate ERP system with our existing systems	3.13	0.9
7	Too risky projects	3.08	1.0
8	Lack of project management experiences	3.02	1.1
9	Difficult for our organization to learn how to operate this new system	2.83	1.2
10	Lack of resources	2.83	1.0
11	Lack of information technology capabilities	2.81	1.1
12	Top management in our organization does not support implementing ERP	2.75	1.0
13	Our organization is not aware of the existence of such systems like ERP	2.70	1.1
14	The solutions provided by ERP vendors do not match our needs	2.69*	0.9
15	ERP systems will not be better than our existing systems	2.58**	1.0
16	We do not think that implementing ERP systems would be valuable	2.58*	1.1
17	Would not increase our productivity	2.33**	0.9
18	ERP systems will not be capable of providing integrated, timely and reliable information as needed	2.19**	0.9

Notes: ** $p < 0.01$; * $p < 0.05$

Two additional papers are noted. First, Duan, Faker, Fesak, and Stuart (2013) present a framework that discriminates not only between Cloud-based ERP and On-premise ERP, but also considers "Hosted ERP" which they define as "a service offered to an individual or an organization by a provider that hosts the physical servers running that service somewhere else". Typically, "Hosted ERP" involves running traditional client/server ERP on a hosted, virtualized environment (typically SaaS or IaaS) and then accessing the server using remote technologies such as Citrix or Remote Desktop. While the system is accessible via the internet, it is not based on cloud technology and cannot be accessed using a web browser via mobile devices such as tablets and cell phones. This is a major differentiator. Their framework comparing traditional, hosted and cloud ERP is shown in Table 36: Hosted vs. On-Premise vs. Cloud ERP (Duan et al, 2013) in 8.2 Appendix .

Lastly, Hoseini (2013) provides a framework of the advantages and disadvantages of adopting SaaS ERP (see Figure 24: SaaS ERP Advantages (Hoseini, 2013) and Figure 25: SaaS ERP Disadvantages (Hoseini, 2013) in Appendix). Note that SaaS does not equal Cloud ERP although there are some similarities. She further tests her framework using a survey of "users" who were "aware of ERP adoption/implementation issues as well as knowledgeable about SaaS adoption issues due to their experience or general knowledge". These "users" were chosen based on descriptions in their LinkedIn profiles and they had to be living in Sweden. Based on her samples size of 45 responses, five of the 19 SaaS ERP advantages are statistically significant (supported) but none of proposed twelve SaaS ERP disadvantages were significant.

2.1.2 SME Applicability

SME's typically do not have large budgets for ERP implementations and not near as much cushion or savings as larger companies in the case of failure. Thus implementing a new ERP system is an even riskier challenge for the SME market. "The cost associated with implementation of ERP systems and difficulties found in achieving management expectations are most significant reasons hindering SMEs to adopt the systems. Over the last decade or so implementation of ERP systems in SMEs is becoming common, as the technology is more established and prices come down" (Ahmad & Pinedo Cuenca, 2013, p. 104). Rao (2000) states that since SMEs do not have the robustness associated with big companies that they have to tap the power of IT and an integrated information system to stay competitive and customer oriented and that ERP is often considered the answer for their survival. To keep up with the increasingly competitive, global, digital marketplace, SMEs will have to confront some sort of ERP decision choice in the near future. These options include (1) to purchase or rent (i.e., SaaS) and implement a system for the first time, (2) to continue upgrading their existing system and/or

enhancing it with "add-on" functionality, or (3) to replace legacy system by purchasing or renting (i.e., SaaS) a new, modernized system based on new technologies (i.e., cloud ERP).

In concluding their analysis about ERP adoption in SME's Haddara (2012) state that "Due to their limited resources, budgets and their high sensitivity to costs, when SMEs take the first step into implementing an ERP system, they need to think about many things, foremost the cost of adoption. Literature suggests that most ERP implementations fail due to inaccurate and optimistic budget and schedule estimations, as well as, anticipating indirect costs beforehand is problematic" (p. 250). Elragal and Haddara (2010) state "sometimes benefits in relation to costs are not important or unattainable. For example, when an SME's budget is crossed, it does not matter how much benefits it will gain through dedicating more money to the project, as it might be out of the required resources already" (p. 99). "SMEs are more cost sensitive than large enterprises. Any cost rise or project delays would seriously affect SMEs' survival in the market. Since ERP adoption within SMEs is still immature, researchers need to inspect and identify the basic drivers that influence ERP adoption decisions, especially ERP adoption costs" (Haddara, 2012, p. 251).

2.2   Cloud Literature

2.2.1   Cloud Definition

Defining "the cloud" is like trying to hit the proverbial moving target – it is tough because it keeps changing. It is similar to what Swanson and Ramiller (1997) introduced to the IS literature as an organizing vision which is a "focal community idea for the application of information technology in organizations" (p. 460). "When an organizing vision is just introduced, the content of the vision might be incoherent as actors interpret the underlying IT innovation in different ways that suit their diverse interests" (Wang & Swanson, 2007, p. 79). Currie (2004) states that these visions have a "revolutionary impact on work organization." This

sounds very much like "the cloud." According to their landing page, the National Institute of Standards and Technology (NIST) had a hard time defining the cloud: "After years in the works and 15 drafts, the NIST's working definition of cloud computing, the 16th and final definition has been published" (NIST Tech Beat, 2011).

NIST states that Cloud computing is an evolving paradigm and that their definition is just to provide a baseline for discussion. With that in mind, the NIST definition of cloud computing is "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" (Mell & Grance, 2011, p. 2). The cloud model is composed of five essential characteristics: on-demand self-service, broad-network access, resource pooling, rapid elasticity, and measured service (see Figure 9 below).

Figure 9: Cloud Computing Models (adapted from NIST)
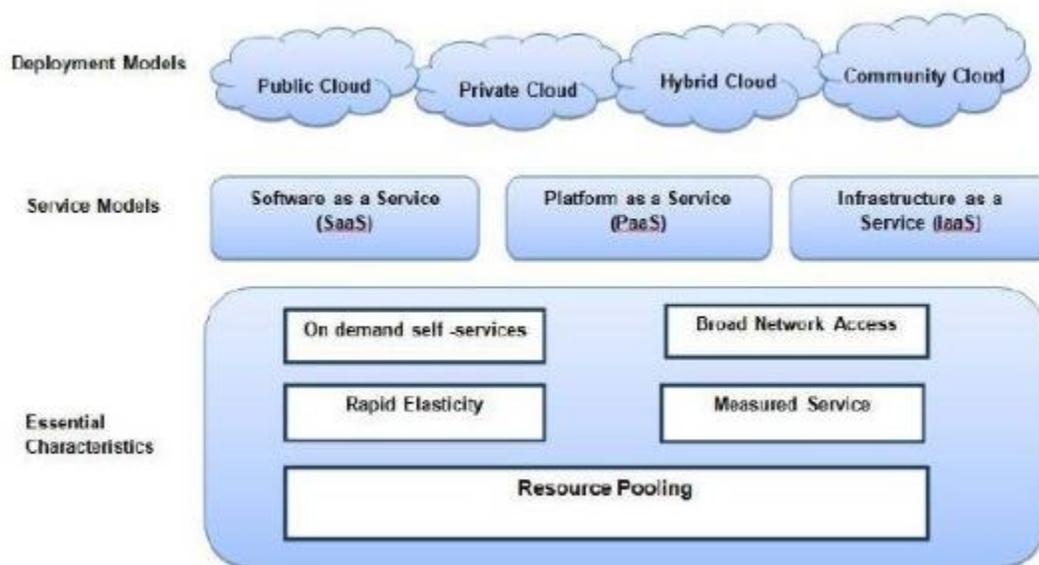
The NIST also identifies three cloud service models and four cloud deployment models. The service models are (Alali & Yeh, 2012, p. 14):

(1) **Software-as-a-Service (SaaS)** allows users to run a variety of software applications on the Internet without having possession or managing applications (e.g., Salesforce.com, Gmail, Microsoft Online, etc.).

(2) **Platform-as-a-Service (PaaS)** provides a computing platform to support building of web applications and services completely residing on the Internet (e.g., Google Apps, Force.com, 3Tera AppLogic).

(3) **Infrastructure-as-a-Service (IaaS)** allows the use of computer hardware and system software, including operating systems and communication networks in which the cloud provider is responsible for hardware installation, system configuration, and maintenance (e.g., Amazon EC2, Citrix Cloud Center).

The deployment models are (Jansen & Grance, 2011):

(1) **Public cloud** is available to the public or a large industry group and is owned by an organization selling cloud services.

(2) **Private cloud** is a cloud operated solely for an organization. It can be managed by the organization or a third party and can exist on or off premises of the organization.

(3) **Community cloud** is a cloud that is shared by several organizations and supports a specific community purpose (e.g., mission, security requirements, policy, and compliance). It can be managed by either an organization or a third party and can be on or off premises of the community organizations.

(4) **Hybrid cloud** is a composition of two or more clouds that remain unique entities but are bound by standardized or proprietary technology that enables data and application portability.

There have been other definitions of the cloud that vary slightly. Marston, Li, Bandyopadhyay, Zhang, and Ghalsasi (2011) state that "There are perhaps as many definitions as there are commentators on the subject…[including NIST]". They further state that "our definition does not explicitly require that the services be provided by a third-party, but emphasizes more on the aspects of (1) resource utilization, (2) virtualized physical resources, (3) architecture abstraction, (4) dynamic scalability of resources, (5) elastic and automated self-provisioning of resources, (6) ubiquity (i.e. device and location independence) and (7) the operational expense model" (Marston et al., 2011, p. 177). This definition allows for private cloud deployment which in turn would rule out multi-tenancy aspects required in some cloud definitions.

Lastly, Kim (2009) provides the more condensed definition as "being able to access files, data, programs and 3rd party services from a Web browser via the Internet that are hosted by a 3rd party provider" and "paying only for the computing resources and services used". He also states that "cloud computing is used synonymously, inaccurately in my view, with such terms as utility computing (or on-demand computing), software as a service (SaaS), and grid computing" (Kim, 2009, p. 65).

2.2.2   Cloud Benefits and Weaknesses

"Cloud computing represents a convergence of two major trends in information technology: (a) IT efficiency, whereby the power of modern computers is utilized more efficiently through highly scalable hardware and software resources, and (b) business agility, whereby IT can be used as a competitive tool through rapid deployment, parallel batch processing, use of compute-intensive business analytics and mobile interactive applications that respond in real time to user requirements" (Marston et al., 2011, p. 177). It represents both a technology and an economic shift in an organization's use of IT resources, offering the potential for significant savings in both IT expenditures and resources (Rosenberg & Mateos, 2011).

Marston et al. (2011) list key advantages and opportunities of cloud computing (p. 177-178, 182):

1) It dramatically lowers the cost of entry for smaller firms trying to benefit from compute-intensive business analytics that were hitherto available only to the largest of corporations,

2) It can provide an almost immediate access to hardware resources, with no upfront capital investments for users, leading to a faster time to market in many businesses. Treating IT as an operational expense (in industry-speak, employing an 'Op-ex' as opposed to a 'Cap-ex' model) also helps in dramatically reducing the upfront costs in corporate computing,

3) Cloud computing can lower IT barriers to innovation,

4) Cloud computing makes it easier for enterprises to scale their services, which are increasingly reliant on accurate information, according to client demand,

5) Cloud computing also makes possible new classes of applications and delivers services that were not possible before (e.g, mobile interactive applications, parallel batch processing, business analytics, and extensions of computer intensive desktop applications),

6) Small businesses can exploit high-end applications like ERP software or business analytics that were hitherto unavailable to them,

7) Potential to help developing countries reap the benefits of information technology without the significant upfront investments that have stymied past efforts, and

8) Cloud computing appeals to large IT infrastructures that want to reduce their carbon footprint.

Marston et al. (2011) also list several weaknesses and threats associated with the cloud (Marston et al., 2011):

1) Organizations will be justifiably wary of the loss of physical control of the data that is put on the cloud,

2) Organizations will also be wary of entrusting mission-critical applications to a cloud computing paradigm where providers cannot commit to the high quality of service and availability guarantees that are demanded in such environments,

3) Backlash from entrenched incumbents (e.g., IT staff and job security),

4) Cloud providers going bankrupt/stability, especially in a down economy,

5) Security,

6) Lack of standards,

7) Vendor lock-in and increasing costs, and

8) Government regulation, from data privacy and access to audit requirements.

2.2.3   SME Applicability

In a rapidly changing, competitive marketplace products and skills become outdated, especially with the pace of technological advancements. SMEs have limited resources and are at a disadvantage. "Cloud computing has the potential to play a major role in addressing inefficiencies and make a fundamental contribution to the growth and competitiveness…[of]

SMEs" (Sahandi, Alkhalil, & Opara-Martins, 2013, p. 1). This new strategy provides for business agility and acts as a catalyst for more innovation allowing SMEs to implement new strategic ideas at a faster pace in order to gain a competitive advantage over their competition (Sahandi et al., 2013). "Cloud computing offers a new pathway to business agility and supports a faster time to market by offering ready-to-consume cloud enable resources such as IaaS, software platforms, and business application…far faster than acquiring, installing, configuring and operating IT resources in house" (Sahandi et al., 2013, p. 2).

Sahandi et al. (2013) surveyed 169 UK SMEs. Their results showed that just over half claimed to know what cloud computing is and 25% were unsure of the concept. This in part may account for the slow adoption of cloud computing by SMEs which is expected to gain acceleration as understanding and awareness of the cloud increases (Sahandi et al., 2013). They also found that the main motivations for SMEs adopting cloud services were cost reduction (45.5%) followed closely by mobility and convenience in accessing applications (44.9%). Ubiquity and flexibility of cloud computing were motives for 38.9% of the respondents while increasing computing capacity (32.9%) and providing greater IT efficiency (31.7%) were found important as well.

When Sahandi et al. (2013) asked what they plan to use cloud-based services for, 32.5% said for their current business operations (ERP). On the flip side, 27% of respondents had no plans to use cloud computing while another 20.2% said that don't know if they would. The good news was that 17.8% said that they planned to used cloud services for new business operations, indicating that SMES are aware of the importance of business agility and the importance of cloud computing in supporting innovative, dynamic and evolving business environments potentially leading to competitive advantage (Sahandi et al., 2013). 54.6% of the surveyed SMEs indicated data protection and privacy as the main reason for not considering cloud

services. Also, almost half of the surveyed SMEs considered vendor lock-in as a major concern for adopting cloud computing' and that they are worried about losing control of their data and lack of trust problems (Sahandi et al., 2013).

From the results of the Sahandi et al. (2013) study, it seems that the potential advantages of cloud computing exist for SMEs to reduce costs and increase agility but it may take some time for the bandwagon phenomenon to occur since knowledge and awareness of cloud computing must increase. It will also take time for SMEs to gain trust and confidence with the vendors and to gain confidence in security issues (Sahandi et al., 2013).

CHAPTER 3: CLOUD ERP SELECTION FRAMEWORK

Saeed et al. (2012) perform an exploratory study using qualitative methods (ten interviews with highly experience ERP practitioners) and a systematic literature review (research papers from 1995-2011 in domains of (1) adoption of new technologies, (2) motives/barriers of traditional ERP, (3) ERP Outsourcing, and (4) characteristics, benefits and challenges of cloud computing) to build a unified framework (UF) of motives and barriers of cloud ERP adoption. They stated "Cloud ERP is a new and emerging area of research and there's a lack of scientific research on this topic. For that reason, it requires exploratory research by using qualitative methods."

This current study will use the components UF as a starting point for the preliminary survey that will be presented to industry experts for face validity and content validity checks. The final Saeed et al. (2012) UF is shown below in Figure 10.

Figure 10: Saeed et al (2012) Unified Framework

Cloud ERP Adoption Motives	Category	Cloud ERP Adoption Barriers	Category
Cloud ERP provide flexibility for business innovation	Strategic	Security and privacy risks are huge in cloud ERP	Technical
Reduced IT cost for the enterprise	Operational	Invested too much into on-premises ERP system	Strategic
Cloud ERP is scalable on-demand	Operational	Government regulations regarding the secure data storage	Operational
Replacing obsolete systems with cloud ERP because of low capital expenditure	Operational	Current traditional ERP systems support business strategy	Operational
Faster time to market for products and services	Strategic	Slow speed of Internet connection & down time of cloud system servers	Operational
Cloud ERP allow users to concentrate on their core business	Strategic	Lack of early adopters because of cloud ERP's low awareness	Strategic
Cloud ERP vendors provide high technical reliability	Technical	Customization is difficult in cloud ERP	Technical
Cloud ERP vendors provide automatic upgrades	Technical	Integration is difficult in cloud ERP	Technical

The next sections detail and describe the individual components of the Motives construct

and the Barriers construct (note that all descriptions below are summarized from Saeed et al.

(2012)).

3.1   Components of "Adoption Motives" Construct

The Adoption Motives are broken into three categories (for convenience): strategic,

operational and technical motives.

3.1.1   Strategic Motives

3.1.1.1 Cloud ERP provides flexibility for business innovation

Cloud ERP enables mobility, allowing access from pretty much any device, anywhere, anytime. It reduces barriers to innovation by allowing new classes of applications and services to be delivered that were not possible before. Cloud solutions are new and modern so vendors typically are in a continuous improvement mode, providing better opportunities for IT innovation which paves the way to business innovation.

3.1.1.2 Faster time to market for products and services

Cloud ERP takes less time to set up since the hardware and software infrastructure are typically maintained by third-party cloud providers. Barring any heavy customization or integration the system can be up and running relatively quickly, benefitting companies by reducing the time to market of their products and services.

3.1.1.3 Cloud ERP allows users to concentrate on their core business

Since the technical aspects (hardware and software) of Cloud ERP are typically managed by expert, third-party cloud providers, companies do not have to hire/maintain internal IT staff to manage and resolve technical problems and can focus on their core business. The service providers are responsible for the technical problems.

3.1.2   Operational Motives

3.1.2.1 Reduced IT cost for the Enterprise

Cloud vendors are able to provide services at a low price because of their economies of scale and dynamic resource sharing. Compared to traditional in-house systems which in addition to the initial capital expenditures require support, maintenance, space, personnel/employees, excess capacity IT personnel/resources and other such costs, cloud ERP includes all of these

costs which reduces the Total Cost of Ownership (TCO). It also becomes affordable to SMEs that cannot justify all the aforementioned ongoing costs.

3.1.2.2 Cloud ERP is scalable on demand

Cloud services are typically virtualized allowing for dynamic resource availability. Thus resources are scalable on demand. This allows companies to pay for the amount of usage that they need as it fluctuates with their demand. This is very attractive to SMEs who have plans for growth in the future and do not want to have to worry about outgrowing their systems capacity.

3.1.2.3 Cloud ERP has low capital expenditure

Enterprises can avoid initial capital hardware and software infrastructure and IT costs by using cloud-based solutions. This is especially attractive to SMEs who are cash-strapped and cost sensitive and do not typically have the resources or know-how to run ERP systems on their own.

3.1.3   Technical Motives

3.1.3.1 Cloud ERP vendors provide high technical reliability

Cloud ERP vendors are more knowledgeable and reliable than in-house IT departments, especially with respect to their cloud ERP system. This is due to economies of scale, their product-specific focus and their specialized product-related technical capabilities. Also, their dynamic resource availability provides more hardware reliability than is possible in-house.

3.1.3.2 Cloud ERP vendors provide automatic upgrades

Cloud vendors can upgrade their systems economically because of the single source codes and multi-tenancy features. This increases an organization's capabilities as the upgrades are done automatically by the vendors.

3.2   Components of "Adoption Barriers" Construct

The Adoption Barriers are broken into the same three categories (for convenience): strategic, operational and technical motives.

3.2.1   Strategic Barriers

3.2.1.1 Invested too much into on-premises ERP systems

Cloud ERP may require lower up-front costs for the hardware and software infrastructure, implementation processes. Costs of both types of systems should be about the same. Other costs already incurred for their existing system such as employee training and customizations may deter a company from re-investing in a Cloud ERP system.

3.2.1.2 Lack of early adopters because of cloud ERP's low awareness

Cloud ERP is new and companies may not be aware of its existence or benefits. Also, cloud ERP products may not have a solid enough track record or reputation for companies to risk such a huge investment in their company's primary information system.

3.2.2   Operational Motives

3.2.2.1 Government regulations regarding the secure data storage

Some governmental regulations regarding data storage were made before cloud computing. Since companies are not aware of the data location in the cloud they may be hesitant to use Cloud ERP since they may be in violation of a regulation with which it it cannot document compliance. Some cloud ERP systems may not meet strict government regulations or SOX requirements for secure cloud data storage.

3.2.2.2 Current traditional ERP systems support business strategy

"If it's not broke, don't fix it." If the current system is meeting a company's primary requirements, why abandon that for a potentially costly, painful, risky investment into a new system? This is especially true if a company is not IT-friendly.

3.2.2.3 Slow speed (or loss) of Internet connection & down time of cloud servers

Due to the Cloud ERP system being located at a remote location accessible only over the internet, unavailability of the cloud provider servers or outage of internet service can become a big disaster. Thus, the potential lack of internet speed, connectivity and server availability can be a big obstacle for Cloud ERP adoption.

3.2.3   Technical Barriers

3.2.3.1 Security and privacy risks are huge in Cloud ERP

Due to the novelty of cloud ERP systems and the loss of control of data, enterprises may not be yet ready to hand over their most important and valuable data yet to a third party. Add on the fact that the data is now in the cloud it makes it even more attractive to hackers. Data security is one of the most cited concerns of cloud computing. Questions also abound about data privacy, data lock-in, vendor dependency and vendor lock-in.

3.2.3.2 Customization is difficult in Cloud ERP

Cloud ERP systems are standardized, with each system based on the same code base. This makes customization more difficult because the environment is stricter and users have less control. There are various cloud ERP solutions available with differing level of customization capabilities. As these products and technologies mature, these problems may subside but nevertheless, customizations are typically known as problem areas in both traditional and cloud ERP products.

3.2.3.3 Integration is difficult in Cloud ERP

Cloud based systems are standardized and in a strict environment and integration may involve applications and data on multiple clouds that are private as well as public or even non-standardized legacy systems. This is becoming less of a problem as cloud service providers

abilities and experience increase as well as the advancement of standardized SOA and web

services expand.

CHAPTER 4: RESEARCH METHODOLOGY

4.1   Research Design

This will be a quantitative study using a survey to collect data. The proposed research model is shown below in Figure 11 as a simple, straightforward variance model positing the identified motives of cloud ERP to the selection of cloud ERP (+ relationship) while the identified barriers of ERP selection will be depicted as the drivers of the decision not to select (-relationship).

Figure 11: Research Model
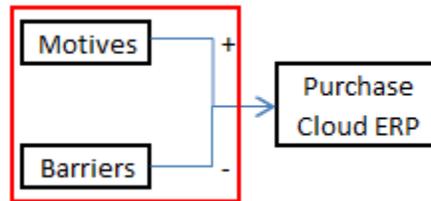
The components of the motives and barriers constructs presented in the UF presented in Chapter 3 will be measured using a field survey. Yin (2009) states that a survey is an appropriate method to use when answering "what" types of research questions (a) that do not require control of behavioral events, and (b) when the focus of the study is on contemporary events.

The primary goal is to measure the constructs of "Motives" and "Barriers" to the purchase or selection decision of a cloud ERP system. VARs of CloudERP will be subjects to complete the survey. Note that there will be no actual measurement of a given customer's Cloud ERP purchase decision. The survey will focus on capturing just the components of the motives construct leading to purchases and more importantly the components of the barriers construct of the non-purchasers based on the CloudERP VAR survey responses.

4.2   **Survey Development**

The starting point of the survey is the UF presented by Saeed et al. (2012) presented in Chapter CHAPTER 3: . The next step in the process was to have the survey checked for face and content validity by ERP experts. Trochim (2008) states that "any time you translate a concept of construct into a functioning and operating reality (the operationalization) you need to be concerned about how well you performed that translation" (p. 58). Trochim (2008) further states that face validity (looking at the operationalization and see whether on its face it seems like a good translation of the construct) and content validity (checking the operationalization against the relevant content domain for the construct) are translation validity types that attempt to assess the degree to which you accurately translate your construct into the operationalization (p. 59).

In order to assess the face and content validity of the UF, I reviewed the UF with CloudERP personnel and I made some minor wording changes for clarification purposes to some of the motives and barriers in the UF. Then I reached out to four VAR owners in the SME ERP industry. The four VARs were selected based on long-time established relationships that I have had with them during my time in the industry. I sent all four of them an email requesting an hour meeting (preferably in person if possible). In the email request I explained the purpose of the meeting along with two attachments: (1) An "Executive Summary" (essentially a document with the abstract from the dissertation proposal, and (2) a "VAR Feedback" form.   The VAR Feedback form essentially presents the UF along with a column to comment. The feedback form has additional pages that provide detailed explanations of the specific items in the UF. Also, subsequent pages were provided at the end of the "VAR Feedback" form that listed additional prompts/ideas for advantages/disadvantages from the SaaS ERP (Hoseini, 2013), Cloud and Hosted ERP (Duan et al., 2013) and Traditional ERP (Kamhawi, 2008) advantage/disadvantage

frameworks mentioned earlier. I gave them the list of these prompts of the other items to experts, who were free to read the items on this list, free to comment and/or recommend them for inclusion in the UF.

I was able to set up meetings with three out of the four ERP VAR owners. Each of the three VAR owners sold both traditional ERP systems to SMEs as well as Cloud ERP systems. Each of the VAR owners are resellers of a different Cloud ERP product (one sold Intaact, one Acumatica, and one NetSuite). Two of these VARS were represented on Accounting Today's Top VAR 100 list of US VARs (Accounting Today, 2013). I had them review the documents that I sent them in preparation for the meetings. I conducted two of the meetings in person. The third meeting was via phone conversation. Ideally, it would have been preferable to conduct each interview in person since the nature of the exchange is richer when non-verbal cues of the interviewee can be observed. But due to the geographical disparity it was most economical to conduct one of the interviews via telephone. Each of the interviews was audio recorded with the interviewees' permission. Each interview lasted between 45 and 75 minutes. The interviews were semi-structured, using each of the individual UF motives and barrier items as a point of discussion. I took notes during each interview with particular emphasis on comments and modifications relating specifically to the UF. The last part of the interview I used to review my notes specific to each of the motives and barriers in the UF with the interviewee and verify that I had captured their comments and/or feedback correctly.

At the conclusion of each of the three interviews, I updated a spreadsheet with three columns for summarizing each of the interviewees' comments regarding each of the items in the UF. This was structured exactly like the "VAR Feedback form" but included the three additional columns of VAR comments. This was useful for presenting and discussing with the staff at CloudERP who would make the final decision on what went out in the survey.

During this same timeframe, I had been working with CloudERP on "demographic" or descriptive questions that were of interest to them relating to this project. We were going to be using CloudERP's VAR channel network to conduct the survey and this was an opportunity to collect information about their channel partners in addition to their feedback on the Cloud ERP motives and barriers. After conducting the interviews with the three VARs, I had one last phone meeting with CloudERP to: (1) review and finalize both the demographic questions, and (2) review the feedback from the expert VARs relating to the motives and barriers. Before this final meeting, I presented to them the additional information I collected from the three VAR interviews in summarized fashion on the VAR feedback form (described earlier). We reviewed, modified and finalized the demographic questions. We also finalized the motives and barriers. The final list of motives are shown in Table 4: Final Cloud ERP Adoption Motives below:

Table 4: Final Cloud ERP Adoption Motives

Cloud ERP Adoption Motives		
#	Saeed et al (2012) Unified UF as Presented	Final Framework used in Survey
1	Cloud ERP provide Flexibility for Business Innovation	**M1:** Cloud ERP provides Flexibility and Mobility enabling Business Innovation
2	Cloud ERP allows Faster time to Market for Products and Services	**M2:** Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services
3	Cloud ERP allow users to Concentrate on their Core Business	**M3:** Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business
4	Cloud ERP Provides Reduced IT Cost for the Enterprise	**M4:** Cloud ERP Provides Reduced Ongoing IT Cost for the Enterprise
5	Cloud ERP is Scalable On-Demand	**M5:** Cloud ERP is Scalable On-Demand
6	Cloud ERP requires Low Capital Expenditure	**M6:** Cloud ERP puchased as SaaS requires Low Capital Expenditure
7	Cloud ERP Vendors provide High Technical Reliability	**M7:** Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being Externally and Centrally Managed by Software Vendor or Service Provider
8	Cloud ERP Vendors provide Automatic Upgrades	Not true for CloudERP; therefore dropped from survey

As can be seen in the Table 4 above, the motives presented in the UF remained mostly

intact. Seven out of the eight initial motives were retained with slight modifications. Several of

the modifications involved a basic change for clarification purposes (adding/including

"purchased as SaaS"[2] to motive #'s 3, 6 and 7). Additional words were added to the text of

motives #1, 2 and 7 in Table 4 for clarification. Motive #8 (in red) was dropped from the survey

since it was not directly applicable to CloudERP's business model[3] (which allows for customer

specified upgrades). This item should be retained for use in a survey that was to be used for a

SaaS vendor that did provide automatic upgrades. Note that the last column of this table presents

the final motives used in this studies' survey (except for last "red" row). Each of these motives

is preceded by "**M#:**" where the # ranges from 1-7. The notation for these motives, M1 through

M7, is presented later in Table 7 in the results section and subsequently used in the coding of the

motive data variables.

The final list of barriers are shown in Table 5: Final Cloud ERP Adoption Barriers below:

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[2]Note that the company that I am working with, CloudERP, is relatively unique to the industry and offers several different purchasing models. One purchasing option is what is termed "Perpetual". This occurs when the customer purchases CloudERP's software upfront and outright (like traditional system purchases and normally an annual maintenance fee for software upgrades and support is required) and the customer then can host the software in-house (private cloud) or pay an ASP to host the system in a cloud environment. Another purchasing CloudERP offers is the SaaS option which is in-line with the NIST's SaaS servicing model. Since the survey will be administered to CloudERP VAR's it was decided that several of the motives and barriers were applicable to only the SaaS purchasing option where CloudERP (the vendor) is responsible for the hosting and other technical aspects associated with the system.

[3] CloudERP does not "automatically" upgrade all of their customers on SaaS at the same time. CloudERP is unique is the "SaaS' vendor world in that they maintain individual instances of each customer's installation. That is, they do not maintain a true, multi-tenant environment (one installation for all customers to run on) which allows the individual customers the benefit of deciding when to upgrade. Thus, the upgrades are not done "automatically".

Table 5: Final Cloud ERP Adoption Barriers

	Cloud ERP Adoption Barriers	
#	**Saeed et al (2012) Unified UF as Presented**	**Final Framework used in Survey**
1	Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP	**B1:** Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP
2	Lack of Early Adopters because of Cloud ERP's Low Awareness	Removed; Disagree; More awareness; Lack of product depth, community, and ISV functionality; Cloud ERP has Functionality limitations
3	N/A	**B2:** Traditional ERP systems have Hosting Options with Internet Service Provider's (ISPs) that provides many benefits touted by cloud ERP
4	Cloud ERP has Potential Problems with Government Regulations regarding the Secure Data Storage	Removed; not applicable to most SME's; audited regulatory environments/HIPAA may be established at hosting provider/ISP and may be benefit
5	N/A	**B3:** Cloud ERP has Functionality Limitations and Depth due to Lack of Community and ISV's
6	Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP	**B4:** Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP
7	Possible Slow speed of Internet Connection & Down Time of Cloud System Servers are Inherent Risks in Cloud ERP	Removed; not really an issue any more; Speed/connectivity has not been an issue for our clients"; Not as common; one VAR gave example of remote location that this applied to but said otherways really N/A
8	More Security and Privacy Risks related to Cloud ERP	**B5:** More Security and Privacy Risks are related to Cloud ERP
9	Customization is Difficult in Cloud ERP	**B6:** Customization is Difficult in Cloud ERP
10	Integration is Difficult in Cloud ERP	**B7:** Integration is Difficult in Cloud ERP
11	N/A	**B8:** Cloud ERP purchased as Saas ERP has Perpetual Ongoing Subscription Expenses

As can be seen in Table 5 above, the initial set of eight barriers from the Saeed et al. (2012) UF has had more changes/modifications than the motives. Barriers #2, 4, and 7 (shown in red) were deemed no longer applicable for the reasons noted and dropped from the survey. Barriers #3, 5 and 11 (shown in blue) were mentioned during the VAR interviews and discussions with Acumatica personnel as more formidable barriers and were added. Barrier #'s 1, 6, 8, 9 and 10 (shown in white) were retained from the original UF (some with minor word

modifications for clarity). Note that the last column of this table presents the final barriers used in this current study's survey (except for the mentioned "red" rows that were removed). Each of these barriers is preceded by "**B#:**" where the # ranges from 1-8. The notation for these barriers, B1 through B8, is presented later in Table 12 in the results section and subsequently used in the coding of the barrier data variables.

The motives listed in Table 4 and barriers listed in Table 5 were included in the survey in three ways. First, I introduced each set (of Motives/Barriers) with the following: "Please select the extent to which you agree/disagree that the items listed below are Motives [Barriers] for selecting a Cloud ERP System". In this instance, a 7 point likert scale (Strongly Disagree to Strongly Agree) was used to measure the "magnitude" or "intensity" of the subjects response. A similar likert type of scale/measure is what has been traditionally used CSF stream of ERP literature, although quite often the scale just measured the level of importance of a particular CSF without a zero point or scale that allowed for disagreement (e.g., you only had the ability to rate it low on importance). Note that by including a scale with a zero point I can measure and test for significance as to whether subjects significantly agree or disagree with the proposed motives and barriers. Second, in addition to this "magnitude" type of measure I asked an additional question for each motive or barrier "What Percentage of your Prospects considers the issues listed below to be an Important Selection Criterion in their Purchase Decision for a Cloud ERP System?". I did this in an attempt to capture another dimension of the construct, frequency, in hopes of being able to add depth of understanding and ability to evaluate the listed motives and barriers. Lastly, after each of the initial motive and barrier "magnitude" sections, I included an open-ended question that will allow VARs to add any additional motives and/or barriers that they feel were important but not listed on the survey.

After receiving IRB approval, I updated the survey on the Qualtrics software survey platform. Next, I performed a pilot study of the survey for design, readability, flow, and functionality. I sent the pilot test survey out to fellow colleagues in my EDB cohort, members of my dissertation committee, as well as members on the staff at CloudERP. In total, 10 people responded and reviewed the online survey. I made minor modifications to the survey based on their feedback before finalizing the survey. The final survey is shown in Appendix D – Cloud ERP Final Survey.

4.3   Selection of Study Participants

The study is as an engaged scholarship research project in collaboration with CloudERP. CloudERP gave me a list of all contacts of their US partners in their CRM system. In total, I received 601 contact names and email addresses. Unfortunately, it was not possible to identify these contacts company's relationship (VAR, ISV, both VAR and ISV or Other) to Acumatica nor was each individual's role, job or position within their organization listed. This current study is interested in the VAR Owners and/or Salespersons that will be able to provide us insights into the motives and barriers of their prospects purchase decisions. So in order to control for this, the first two questions on the survey asked (1) "What is your company's relationship with CloudERP?", and (2) "What is your position/job/role within your company (choose all that apply)?". I used these two questions to filter the responses for the analysis presented later in the Results section.

4.4   Data Collection

I used Qualtrics to administer the survey. I uploaded participants name and email addresses supplied by CloudERP into the Qualtrics software. I used Qualtrics to email out a request to take the survey (shown in Appendix D – Cloud ERP Final Survey) as well as the reminder emails to participants who had not yet completed the survey. Qualtrics sent the email

request with a signature and reply address of the Director of Marketing from CloudERP. The

subject line was "CloudERP Commissioned Research Study – Motives & Barriers to Cloud ERP

Selection" (or a slight variation for the reminder emails). The body of the email mentioned that

"CloudERP is working with Georgia State University on this project and encourages your

participation" along with reasons for participating and the option to receive a summary of the

research results. The initial email and opening date for the survey was January 16, 2014 and the

closing date of the survey was February 9, 2014. Daily response rates are shown for this time

period in Table 6: Daily Survey Responses below:

Table 6: Daily Survey Responses

Date	Surveys Started	Surveys Finished
1/16/14 11:00 PM	37	25
1/17/14 11:00 PM	40	27
1/18/14 10:01 PM	42	28
1/19/14 11:35 PM	43	29
1/20/14 11:15 PM	51	35
1/21/14 11:09 PM	76	53
1/22/14 9:44 PM	82	55
1/23/14 9:44 PM	85	58
1/24/14 9:44 PM	86	59
1/25/14 9:44 PM	86	59
1/26/14 9:55 PM	86	59
1/27/14 10:53 PM	90	61
1/28/14 11:50 PM	123	84
1/29/14 10:09 PM	124	85
1/30/14 10:14 PM	126	89
1/31/14 11:48 PM	126	91
2/1/14 11:48 PM	126	91
2/2/14 11:48 PM	126	91
2/3/14 10:32 PM	126	91
2/4/14 9:56 PM	126	91
2/5/14 11:52 PM	139	102
2/6/14 11:52 PM	139	103
2/7/14 11:52 PM	143	106
2/8/14 11:52 PM	146	108
2/9/14 11:52 PM	147	110
2/10/14 11:52 PM	147	110
2/11/14 11:52 PM	147	110
2/12/14 11:52 PM	147	110

Highlighted in yellow is the day of the initial email and also the days reminders emails were sent. Notice the jumps in the response rates on the highlighted dates of the reminder emails. Note also that the final date, February 9, 2014, highlighted in red shows that 110 total surveys were completed (note that the survey was left open an additional three days but no additional responses were received).

CHAPTER 5: RESULTS

5.1   Survey Response Rates

As previously mentioned, CloudERP provided a mailing list of all contacts in their CRM system. The initial list contained 601 contacts. After doing some preliminary scrubbing of the database for some obvious bad records (e.g., 12 records were eliminated due to missing or bad email address or name), the survey was emailed to 589 individuals using Qualtrics on January 16, 2014. Of these 589 email addresses, there were 12 (in addition to the 12 that reduced the initial dataset from 601 to 589) records with the same person's name but two different email addresses. Assuming that the same individual was not going to reply twice there is another 12 contacts that effectively reduced the initial persons emailed. Additionally, there were 70 email addresses that were "bounced" back as undeliverable (I logged these addresses for tracking purposes). This effectively gave us a maximum number of "good" contacts of 507 (589 – 12 – 70 = 507). As noted earlier in Table 6: Daily Survey Responses, the result was 110 surveys completed. Of these 110 "completed" survey responses, four were very incomplete (initially started and most of the answers were left blank including all of the barrier and motives answers left unanswered) and were not included. Thus, there were essentially 106 completed surveys. This computes into a response rate of either 21.70% (110/507 = .2170) or 20.91% (i.e., 106/507 = .2091)

The CloudERP CRM database did not break down the contacts as to their company relationship (e.g., VAR or ISV or Other) and the position of the contact (e.g., Owner, Sales Person, Marketing, Project Manager, Consultant, Programmer, Other, etc.). The demographic portion of the survey had two questions to identify the respondents that were of interest to this research project. One question had the respondent select their companies relationship to

CloudERP (single answer question, with four options: (1) VAR, (2) ISV, (3) VAR and ISV, (4) Other). This project is only interested in the respondents that were members of VARs so answers (1) or (3) had to be selected. Out of the 106 completed surveys, 101 were VARs (i.e., they selected 1 or 3). In addition, there was a question that asked for the respondent's role(s) within the company (multiple selections were allowed). Of the positions mentioned earlier, this current study is interested in persons that are interacting with the prospects during the sales process, which would be the Owners and Sales Persons. There were a total of 68 VAR respondents that were Owners or Sales Persons (49 of these persons were VAR Owners)[4]. Thus, out of the 106 usable survey responses, I am conducting the remaining analyses on the 68 observations that are from VARs and also selected either "Owner" or "Sales" as their role/position.

5.2   UF Motives and Barriers Questions

5.2.1   Motives

Table 7 below presents the list of the final seven motives used in the survey along with their respective "short code" M1 – M7. These codes are referenced in the results and elsewhere in the paper.

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[4] It is worth noting that it could be argued that Marketing persons in VARs should be included but it is questionable whether they have direct contact and interaction with the prospects. In addition, this would only increase the resulting usable sample size from 68 to 71. I elected not to include the "Marketing" persons (i.e., those who selected "Marketing" but did not select either "Owner" or "Sales").

Table 7: List of Motives and Codes

Code	Complete Motive Question
M1	Cloud ERP provides Flexibility and Mobility enabling Business Innovation
M2	Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services
M3	Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business
M4	Cloud ERP Provides reduced ongoing IT Cost for the Enterprise
M5	Cloud ERP is Scalable On-Demand
M6	Cloud ERP puchased as SaaS requires Low Capital Expenditure
M7	Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being externally and centrally managed by Software Vendor or Service Provider

Table 8 below is a summary of descriptive statistics for the Motives. Generally the descriptive statistics and histograms (not shown) for the motives support a rather "normal" distribution (although some left skewness tendencies exist due to the nature of the likert scale being "cut-off" on the right side of the distribution). Absolute value of skewness scores above one are an indicator or a skewed distributions. Also, a skewness score or kurtosis score of more than three times their respective standard deviations indicate possible non-normal distributions (whereas the skewness determines the "skew" or offset of a distribution, the kurtosis measures the "flatness" of a distribution). In addition to t-tests, I use non-parametric tests (Wilcoxon Signed Rank Test) to alleviate any potential concerns presented by non-normality of these variables.

Table 8: Motives Descriptive Statistics

		M1-Mag	M2-Mag	M3-Mag	M4-Mag	M5-Mag	M6-Mag	M7-Mag
N	Valid	67	67	67	67	67	67	68
	Missing	1	1	1	1	1	1	0
Mean		1.99	1.00	1.01	1.34	1.81	1.27	1.26
Median		2	1	1	1	2	2	1
Mode		2	1	0	1	2	2	2
Std. Deviation		1.037	1.456	1.387	1.309	1.158	1.442	1.217
Skewness		-1.902	-.516	-.203	-1.296	-1.117	-1.021	-.734
Std. Error of Skewness		.293	.293	.293	.293	.293	.293	.291
Kurtosis		6.883	-.191	-.681	2.530	1.039	.519	.322
Std. Error of Kurtosis		.578	.578	.578	.578	.578	.578	.574
Minimum		-3	-3	-2	-3	-2	-3	-2
Maximum		3	3	3	3	3	3	3

Table 9 below provides a summary of significance tests for differences from zero for all the motives. For each motive, two test results (2-tailed) are displayed: (1) T-Tests (assumes normal distribution), and (2) Wilcoxon Signed Rank Test (non-parametric equivalent). I use a two-tailed test to allow for the possibility the survey respondents significantly disagree with a particular motive (or barrier). If a significant disagreement were the result, then it may indicate that the item was actually a barrier (if a motive was being tested and vice versa for a barrier).

Table 9: Tests of Differences for Motives

Motive Magnitude Measure	Test Value = 0						Wilcoxon Signed Rank Test p-value (2-tailed)
	T-Test						
	t	df	Significance (2-tailed)	Mean Difference	95% Confidence Interval of the Difference		
					Lower	Upper	
M1-Mag	15.668	66	0.000 *	1.985	1.73	2.24	0.000 *
M2-Mag	5.620	66	0.000 *	1.000	0.64	1.36	0.000 *
M3-Mag	5.989	66	0.000 *	1.015	0.68	1.35	0.000 *
M4-Mag	8.399	66	0.000 *	1.343	1.02	1.66	0.000 *
M5-Mag	12.767	66	0.000 *	1.806	1.52	2.09	0.000 *
M6-Mag	7.203	66	0.000 *	1.269	0.92	1.62	0.000 *
M7-Mag	8.569	67	0.000 *	1.265	0.97	1.56	0.000 *

Note that ALL Motives magnitude measures (M1 – M7) are significantly different than zero for both sets of difference tests (alpha = .05, two-sided). Setting distribution assumptions aside, the more conservative Wilcoxon Signed Rank Tests agree with the T-test showing that the VARs significantly agreed with all motives tested in the survey.

All seven motives tested in the survey are supported as shown in Table 9: Tests of Differences for Motives. These motives span the major trends and shifts touted as benefits of the cloud. "Cloud computing represents a convergence of two major trends in information technology: (a) IT efficiency, … and (b) business agility" (Marston et al., 2011, p. 177). It represents both a technology and an economic shift in an organization's use of IT resources, offering the potential for significant savings in both IT expenditures and resources (Rosenberg & Mateos, 2011). In a rapidly changing, competitive marketplace products and skills become outdated, especially with the pace of technological advancements. SMEs have limited resources and are at a disadvantage. "Cloud computing has the potential to play a major role in addressing inefficiencies and make a fundamental contribution to the growth and competitiveness…[of] SMEs" (Sahandi et al., 2013, p. 1). This new strategy provides for business agility and acts as a catalyst for more innovation allowing SMEs to implement new strategic ideas at a faster pace in order to gain a competitive advantage over their competition (Sahandi et al., 2013). Overwhelmingly, the VARs surveyed agreed with all of the espoused motives of cloud ERP selection.

5.2.1.1 Additional Motives

After the survey participants were asked the set of questions regarding the extent to which they agree/disagree with the UF motives, they had the opportunity to fill in an open ended question "Please List any Additional Motives (Incentives or Advantages) for selecting a Cloud ERP system that you feel are important and are not listed above (or comments regarding the ones

listed above)." Below in Table 10 is the summary of answers that they provided. The majority

of these are not really "additions" but can be categorized under one of the already existing

motives or barriers codes (see reason column).

Table 10: Additional Motives

Additional Motives	Reason
Mobile apps go hand in hand with webbased ERP.	M1
Integration with social media, other collaboration software and LOB applications makes more sense when ERP is cloud based.	M1
TCO	M4,M6
Most users want browser based software.	M1
Cash preservation ... some companies do not want to shell out a large, up front payment for on Premise	M6
Rapid growth environments, in particular, venture-back or PE-back operations, are ripe for Cloud ERP solutions as their exit strategy may focus on acquisition, in which case they will likely assume the ERP solution of the acquirer.	M2
I think it's faster to have a cloud-based setup simply because hardware choices do not have to be made, servers do not have to be purchased and configured, and 'the new ERP' system doesn't look like a threat to an existing IT department.	M2
Can turn on a cloud ERP deployment very quickly and move into a proof of concept	M2
Easier to customize and integrate , data security , allows more users to access the system since it is not a per users license.	B5,B6, B7
Total cost of software ownership is lower over time.	M4,M6
Designed for browsers and accompanies by a mobile app.	M1
Licensing methods could encourage organizations to more easily encourage and number of nontraditional users to more easily gain access to system	M1
With ease of remote access another motive would be mobility of workforce and ease of interface compared to other remote desktop access solutions.	M1
Cloud ERP's ability to integrate with other solutions in the market place is key. Being web services enabled creates a common platform for integration. Building connectors to solutions like Salesforce.com is key to success.	B7
Inability to recruit skilled IT personnel for internal projects.	M7
Ability to handle multiple locations more effectively	M1
Different platform access.	M1
Allows users to work from anywhere with any device.	M1
Access from anywhere .	M1
These "Motives" are quite situational. For some organizations, High Technical Reliability may be easily achieved using traditional on-premise ERP. Others, however, may not be able to achieve that internally. Other motives, that again are situational, may include Security, Disaster Recovery, Accessibility.	M7,B2, B4,B5
Platform independence, geographic independance	M1
Performance, reliability, and accessibility	M1,M5, M7
Supporting any browser or device is as big as the above reasons.	M1
SaaS is great if the provider actually provides a strong reliable backbone. So far, I don't get that warm fuzzy feeling of this.	M7
From a SAAS provider viewpoint, I am anxious to start actively selling in this market. I believe that it will increase the profitability of my company by reducing my technical support staff costs.	M7
The flexibility of providing deployment across hardware platforms and browsers and the ease of access to information that Cloud ERP provides.	M1

In Table 10 above, I coded each of the items that was answered as "Additional Motives"

in the open-ended survey question. Each of these items "fit" into one (or more) of the existing

motives and barriers that were already presented. Table 11 below shows a ranking of the most

frequently coded motive/barriers from this analysis.

Table 11: Summary of Additional Motives

Code	Description	Qty
M1	Cloud ERP provides Flexibility and Mobility enabling Business Innovation	14
M7	Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being externally and centrally managed by Software Vendor or Service Provider	5
M2	Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services	3
M6	Cloud ERP puchased as SaaS requires Low Capital Expenditure	3
M4	Cloud ERP Provides reduced ongoing IT Cost for the Enterprise	2
B5	More Security and Privacy Risks related to Cloud ERP	2
B7	Integration is Difficult in Cloud ERP	2
M5	Cloud ERP is Scalable On-Demand	1
B2	Traditional ERP systems have hosting options with Internet Service Provider's (ISPs) that provides many benefits touted by cloud ERP	1
B4	Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP	1
B6	Customization is Difficult in Cloud ERP	1
M3	Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business	0
B1	Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP	0
B3	Cloud ERP has Functionality limitations and depth due to Lack of community and ISV's	0
B8	Cloud ERP purchased as Saas ERP has perpetual ongoing Subscription expenses	0
Total		35

Albeit this is already an existing motive, different wordings, flavors and variations of

"flexibility and mobility enabling business innovation" distinctly stood out from the rest.

5.2.2   Barriers

Table 12 below presents the list of the final eight barriers used in the survey along with

their respective "short code" B1 – B8. These codes are referenced in the results and elsewhere in

the paper.

Table 12: List of Barriers and Codes

Code	Complete Barrier Question
B1	Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP
B2	Traditional ERP systems have hosting options with Internet Service Provider's (ISPs) that provides many benefits touted by cloud ERP
B3	Cloud ERP has Functionality limitations and depth due to Lack of community and ISV's
B4	Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP
B5	More Security and Privacy Risks related to Cloud ERP
B6	Customization is Difficult in Cloud ERP
B7	Integration is Difficult in Cloud ERP
B8	Cloud ERP purchased as Saas ERP has perpetual ongoing Subscription expenses

Table 13 below is a summary of descriptive statistics for the barriers. Generally, the descriptive statistics and histograms (not shown) for the barriers DO NOT support a "normal" distribution (generally the histograms are rather flat and/or bi-modal). Absolute value of skewness scores above one are an indicator or a skewed distributions. Also, a skewness score or kurtosis score of more than three times their respective standard deviations indicate possible non-normal distributions (whereas the skewness determines the "skew" or offset of a distribution the kurtosis measures to "flatness" of a distribution). In addition to t-tests, I use non-parametric tests (Wilcoxon Signed Rank Test) to alleviate any potential concerns presented by non-normality of these variables.

Table 13: Barriers Descriptive Statistics

		B1-Mag	B2-Mag	B3-Mag	B4-Mag	B5-Mag	B6-Mag	B7-Mag	B8-Mag
N	Valid	67	68	67	67	67	67	67	68
	Missing	1	0	1	1	1	1	1	0
Mean		.94	.26	.60	-.03	.46	-.22	-.10	1.47
Median		1.00	1.00	1.00	0.00	1.00	0.00	0.00	2.00
Mode		1	1	2	1	2	1	1	2
Std. Deviation		1.424	1.431	1.679	1.576	1.820	1.748	1.742	1.419
Skewness		-.671	-.264	-.421	-.452	-.350	.144	-.048	-.794
Std. Error of		.293	.291	.293	.293	.293	.293	.293	.291
Kurtosis		-.307	-1.065	-1.013	-.899	-1.135	-.972	-1.215	-.173
Std. Error of Kurtosis		.578	.574	.578	.578	.578	.578	.578	.574
Minimum		-2	-3	-3	-3	-3	-3	-3	-2
Maximum		3	3	3	2	3	3	3	3

Table 14 below provides a summary of significance tests for differences from zero for all the motives. For each barrier, two test results (2-tailed) are displayed: (1) T-Tests (assumes normal distribution), and (2) Wilcoxon Signed Rank Test (non-parametric equivalent).

Table 14: Tests of Differences for Barriers

Barrier Magnitude Measure	Test Value = 0						Wilcoxon Signed Rank Test p-value (2-tailed)
	T-Test						
	t	df	Significance (2-tailed)	Mean Difference	95% Confidence Interval of the Difference		
					Lower	Upper	
B1-Mag	5.406	66	0.000 *	0.940	0.59	1.29	0.000 *
B2-Mag	1.525	67	0.132	0.265	-0.08	0.61	0.119
B3-Mag	2.910	66	0.005 *	0.597	0.19	1.01	0.004 *
B4-Mag	-0.155	66	0.877	-0.030	-0.41	0.35	0.796
B5-Mag	2.081	66	0.041 *	0.463	0.02	0.91	0.058
B6-Mag	-1.048	66	0.298	-0.224	-0.65	0.20	0.241
B7-Mag	-0.491	66	0.625	-0.104	-0.53	0.32	0.503
B8-Mag	8.545	67	0.000 *	1.471	1.13	1.81	0.000 *

For the barriers, both t-tests and non-parametric tests show that B1, B3 and B8 are significantly different from zero. Unlike the motives where seven out of seven were statistically significant, VARs only agreed with three of the eight barriers as shown in Table 14: Tests of

Differences for Barriers above. Of these three significant barriers, two of these (barriers B3 and B8) were added by this current study as a result of the face and content validity checks with the expert VARs and personnel from CloudERP.

Barrier B3 is significant. This barrier relates to the cloud ERP functionality limitations and product depth due to lack of community and ISV's. This should be somewhat expected for new technology, especially in the early stages. This type of barrier (B3) is always going to be an issue with newer technology as it takes time for members of a community (e.g., customers, vendors, consultants, users, etc.) to get up the learning curve, accept, adopt, figure out their roles, etc. Over time I would anticipate that this barrier slowly erodes as the market grows and matures.

Barriers B1 (already have invested too much in their current system) and B8 (perpetual and/or ongoing SaaS subscription expenses) both deal with cost factors. B1 sounds very similar to the "sunk cost phenomenon". The decision to continue operating with their current system, sinking money into upgrades, patches, and add-on products versus investing in a new ERP system are typical symptoms of an "Escalation of Commitment" situation. This would be interesting to see how much this sunk cost "trap" plays a role in the SME selection decision process.

Barrier B8 impacts a TCO analysis. This is very similar to an individual's decision to buy or lease a car. Leasing a car was slow to catch on and is not for everyone. Vendors need to be careful about how the ongoing subscription costs compare to the traditional model of purchasing the software upfront. One VAR mentioned as a comment in the additional barriers section that "Although it is difficult to highlight all the costs associated with maintaining a server in-house, the typical small to medium sized business sees the cost of SaaS far exceeding the cost of traditional on Premise [traditional ERP] after about 3-years." This break-even period is

particularly susceptible to the currently low interest rate environment where SME business owners might rather finance and purchase the ERP software upfront versus the ongoing subscription costs required by SaaS.

For B5, the T-test provides a significant result while the more conservative Wilcoxon Signed Rank Test does not. Figure 12 below shows that the distribution is for B5 is bi-modal and does not meet the test for normality. Thus, barrier B5, "More Security and Privacy Risks" is not significant. This security/privacy issue is controversial. Some people feel uncomfortable "handing over" their data and information to somebody else (i.e., the owners of the cloud where you store your data). Others realize that the professionals running and monitoring the cloud infrastructure that their data is stored on probably do a better job of securing data than their internal SME resources can provide (since the cloud company is in the business of storing and monitoring data while they are probably not).

Figure 12: Barrier 5 Histogram
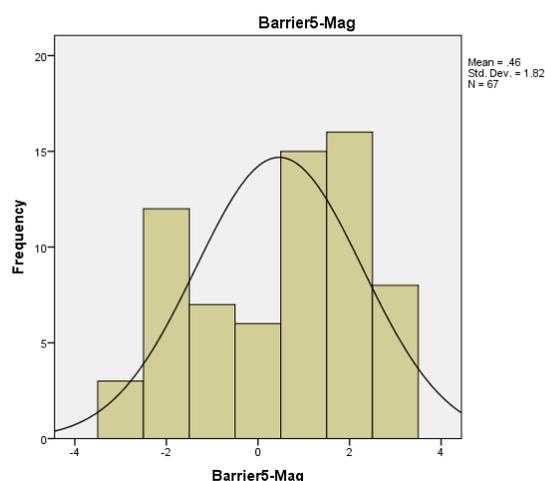
Another interesting point is that B4, B6 and B7 all have negative means and median values equal to zero. In particular, B6 and B7 deal with difficulties of customization and

integration in the cloud. It appears that VARs feel that customers no longer view these technological aspects as obstacles.

B2 and B4 are not significant. These barriers deal with traditional ERP systems already providing benefits (hosting and strategic) similar to the cloud. VARs reportedly feel that objections by customers that traditional ERP systems offer similar advantages provided by the cloud are no longer significant hurdles either.

5.2.2.1 Additional Barriers

After the survey participants were asked the set of questions regarding the extent to which they agree/disagree with the UF barriers, they had the opportunity to fill in an open ended question "Please List any Additional Barriers (Objections, Disincentives or Disadvantages) for selecting a Cloud ERP system that you feel are important and are not listed above (or comments regarding the ones listed above)." Below in Table 15 is the summary of answers that they provided. The majority of these are not really "additions" but can be categorized under one of the already existing barriers or motives codes (see reason column).

Table 15: Additional Barriers

Additional Barriers	Reason
Lack of security in the cloud is a perception, not the reality, that needs to be addressed with potential clients.	B5
Cloud ERP systems are mostly generic, and not customized enough for an industry.	B1
Best of breed systems satisfy the customer's needs 90%.	B1,B2,B4
Change of management (procedures) is always very hard to achieve with people.	Risk, Change
Data securty, data recovery for migration, data storage off shore, access to data (database level) for reporting/analysis.	Data, B3,B5
Some customers are concerned about who "owns" their data when it is in the cloud. This can be one of the bigger barriers when dealing with users that are used to a traditional system where their data is always inside their network.	Data, B5
Although it is difficult to highlight all the costs associated with maintaining a server in-house, the typical small to medium sized business sees the cost of SaaS far exceeding the cost of traditional onPremise after about 3-years.	B8
Many clients, although willing to pursue the cloud for some line of business applications, may find the notion of a cloud-based ERP solution from a relatively unknown vendor to be too risky.	Risk,B5
The CRM is not very robust need more ISVs such as commissions calculator. Also there are request for interface with MS Outlook and MS office.	B3
Fetting infrastructure as a service (hosted servers) is a competing factor to this as well.	B2
Lack of functionality. Not a mature product. Bugs.	B3
Reputation	B3
Functionality	B3
Cloud ERP does not eliminate the need for IT services. In fact, it might increase it.	M4,M7
There is a dependency on the internet that did not exist when the old ERP systems were deployed on a client server environment.	Risk, Internet
Many traditional VARs have business models that are dependent on selling and supporting on-premise solutions. The VAR channel is confused, and continues to confuse the buyer.	VAR,B3
SaaS providers, or more specifically Cloud Infrastructure providers have confusing and constantly evolving pricing models. As an example, no business owner wants to think about how much Bandwidth I need to consume in a month. Work through the pricing model of almost any SaaS provider and they contain add-on services that "may apply". The market needs to figure out how to eliminate these.	Vendor, VAR, B3
Can access historical data if make a change	Vendor, B3
In SaaS, inability to have access to the database management system for timed backup, restores when needed, and deeper customizations are not easily, if at all, available	Vendor, B3,B6
Rapid change of a new company like CloudERP are barriers for partners and customers. CloudERP does not feel like Microsoft or IBM. CloudERP still lacks depth of features especially in the project modules that should be added and do not require ISV's.	Vendor, B3
Most companies are leery of becoming completely dependent on the internet.	Risk, Internet
Annual subscription costs typically have a longer ROI than traditional Perpetual licenses unless the entire IT philosophy at the customer's company has changed.	B8
Loss of control -- if performance is inadequate you are totally dependent upon the host company, data backups are totally dependent, when downtimes (for maintenance, etc.) occur is totally dependent, upgrades (when they occur, how often, etc.)	Risk, Control, M7
Price is an issue for smaller companies. They often have broad requirements but don't have the budget to afford all they need.	Imp Cost, B8
Fund Accounting	B3

In Table 15 above, I coded each of the items that was answered as "Additional Motives" in the open-ended survey question. Most of these items "fit" into one (or more) of the existing motives and barriers that were already presented. I added a few categories for those items that

did not fit into an existing motive or barrier category. Table 16 below shows a ranking of the

most frequently coded motives/barriers from this analysis.

Table 16: Summary of Additional Barriers

Code	Description	Qty
B3	Cloud ERP has Functionality limitations and depth due to Lack of community and ISV's	11
Risk	Problems associated with risk	5
B5	More Security and Privacy Risks related to Cloud ERP	4
Vendor	Vendor specific items	4
B8	Cloud ERP purchased as Saas ERP has perpetual ongoing Subscription expenses	3
B1	Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP	2
B2	Traditional ERP systems have hosting options with Internet Service Provider's (ISPs) that provides many benefits touted by cloud ERP	2
M7	Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being externally and centrally managed by Software Vendor or Service Provider	2
Data	Data ownership, control or access to data	2
Internet	Issues related to internet	2
VAR	VAR specific item	2
B4	Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP	1
B6	Customization is Difficult in Cloud ERP	1
M4	Cloud ERP Provides reduced ongoing IT Cost for the Enterprise	1
Change	Problems dealing with change	1
Control	Loss of control	1
Imp Cost	Implementation Cost	1
B7	Integration is Difficult in Cloud ERP	0
M1	Cloud ERP provides Flexibility and Mobility enabling Business Innovation	0
M2	Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services	0
M3	Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business	0
M5	Cloud ERP is Scalable On-Demand	0
M6	Cloud ERP puchased as SaaS requires Low Capital Expenditure	0
Total		45

The existing barrier "ERP Functionality Limitations due to depth of community" was

also expressed again as a frequent barrier when the survey participants were given an opportunity

to list additional barriers. Also, the category of "risk" which did not fit into the original list of

barriers appeared five times.

5.2.3   Other Data Analysis

5.2.3.1 Frequency Measures

In addition to measuring the "Magnitude" dimension of the motives and barriers listed in the UF, I attempted to assess a "Frequency dimension for the components of the motives and barriers construct. On the survey, the following question was by asked for each of the motives and barriers: "What percentage of your prospects considers the issues listed below to be an important selection criterion (can be either positive or negative criterion) in their purchase decision for Cloud ERP system?" These were measured using a slider scale with the possible answer range from zero to 100.

I ran Spearman (non-parametric) 2-tailed correlations to test if the two different dimensions (magnitude and frequency) were captured. I checked to see if the "magnitude" measure for each of the items (e.g., M1-Mag) was correlated with its "twin" (e.g., M1-Freq). If they were not, different aspects of the respective motive and barrier components were being captured. Unfortunately, Table 17 and Table 18 below show that all the magnitude measures for each of the individual motive and barrier components was significantly correlated with its "twin". For motives, the correlations range from .321 to .608 whereas the barrier correlations range from .366 to . 803. The percentage of overlapping variance between magnitude and frequency is moderate. The "red" highlights in these two tables show extreme correlations in cells where that correlation is higher for a "non-twin" measure than it is for the related twin measure.

Table 17: Spearman Correlations - Motive Magnitudes and Frequencies

			M1-Freq	M2-Freq	M3-Freq	M4-Freq	M5-Freq	M6-Freq	M7-Freq
Spearman 's rho	M1-Mag	Cor Co	.602**	.293*	0.247	0.226	0.207	-0.003	.271*
		Sig. (2-t)	0	0.021	0.053	0.075	0.106	0.982	0.033
		N	63	62	62	63	62	64	62
	M2-Mag	Cor Co	0.111	.628**	.401**	.272*	0.133	0.066	0.23
		Sig. (2-t)	0.387	0	0.001	0.031	0.303	0.603	0.073
		N	63	62	62	63	62	64	62
	M3-Mag	Cor Co	0.129	.331**	.563**	0.132	0.101	0.204	.282*
		Sig. (2-t)	0.315	0.009	0	0.304	0.435	0.106	0.026
		N	63	62	62	63	62	64	62
	M4-Mag	Cor Co	.444**	.333**	.325**	.680**	0.2	0.146	.296*
		Sig. (2-t)	0	0.008	0.01	0	0.118	0.249	0.02
		N	63	62	62	63	62	64	62
	M5-Mag	Cor Co	.304*	0.081	0.2	0.158	.444**	0.102	0.21
		Sig. (2-t)	0.015	0.533	0.119	0.215	0	0.421	0.102
		N	63	62	62	63	62	64	62
	M6-Mag	Cor Co	0.071	0.155	.301*	0.072	0.002	.440**	-0.017
		Sig. (2-t)	0.581	0.23	0.017	0.575	0.99	0	0.894
		N	63	62	62	63	62	64	62
	M7-Mag	Cor Co	0.17	0.161	.412**	0.016	0.184	.284*	.321*
		Sig. (2-t)	0.178	0.207	0.001	0.902	0.15	0.022	0.01
		N	64	63	63	64	63	65	63

*. Correlation is significant at the 0.05 level (2-t).

**. Correlation is significant at the 0.01 level (2-t).

Table 18: Spearman Correlations - Barrier Magnitudes and Frequencies

			B1-Freq	B2-Freq	B3-Freq	B4-Freq	B5-Freq	B6-Freq	B7-Freq	B8-Freq
Spearman's rho	B1-Mag	Cor Co	.621**	0.22	0.189	.252*	-0.036	0.088	0.115	0.083
		Sig. (2-t)	0	0.084	0.146	0.049	0.778	0.492	0.372	0.517
		N	62	63	61	62	64	63	62	63
	B2-Mag	Cor Co	0.235	.631**	.267*	.315*	.277*	0.192	0.172	0.02
		Sig. (2-t)	0.064	0	0.036	0.012	0.026	0.129	0.178	0.875
		N	63	64	62	63	65	64	63	64
	B3-Mag	Cor Co	0.157	.324**	.803**	0.236	0.073	0.244	.262*	0.047
		Sig. (2-t)	0.224	0.01	0	0.065	0.568	0.054	0.04	0.717
		N	62	63	61	62	64	63	62	63
	B4-Mag	Cor Co	.326**	.435**	.264*	.677**	.335**	0.084	0.14	0.093
		Sig. (2-t)	0.01	0	0.04	0	0.007	0.511	0.279	0.468
		N	62	63	61	62	64	63	62	63
	B5-Mag	Cor Co	0.095	0.22	0.162	.283*	.571**	0.189	0.155	0.153
		Sig. (2-t)	0.46	0.083	0.212	0.026	0	0.137	0.23	0.232
		N	62	63	61	62	64	63	62	63
	B6-Mag	Cor Co	0.089	.295*	0.243	0.187	.274*	.366**	.300*	0.024
		Sig. (2-t)	0.494	0.019	0.059	0.145	0.028	0.003	0.018	0.851
		N	62	63	61	62	64	63	62	63
	B7-Mag	Cor Co	0.052	.322*	0.242	0.131	0.16	.421**	.472**	0.074
		Sig. (2-t)	0.69	0.01	0.06	0.309	0.207	0.001	0	0.564
		N	62	63	61	62	64	63	62	63
	B8-Mag	Cor Co	0.001	-0.065	0.175	0.006	.247*	0.023	-0.05	.502**
		Sig. (2-t)	0.993	0.607	0.174	0.962	0.047	0.857	0.696	0
		N	63	64	62	63	65	64	63	64

*. Correlation is significant at the 0.05 level (2-t).

**. Correlation is significant at the 0.01 level (2-t).

The ranked means (from high to low) of the motive magnitude and frequency measures are shown in Figure 13 and the barrier magnitude and frequency measures are shown in Figure 14. These figures demonstrate how the frequency measure means tend to "follow" their respective magnitude means for both motives and barriers. This evidence combined with the significant correlations presented above leads me to conclude that the magnitude and frequency measures are moderately correlated.

Figure 13: Motive Magnitude and Frequency Mean Ranking Comparison

Motives Magnitude Measure				Motives Frequency Measure		
Motive	Mean	Std Dev		Motive	Mean	Std Dev
M1	1.99	1.04		M1	66.69	23.82
M5	1.81	1.16		M5	63.68	27.27
M4	1.34	1.31		M7	58.78	28.07
M6	1.27	1.44		M6	58.65	29.78
M7	1.26	1.22		M4	56.52	27.27
M3	1.01	1.39		M2	49.44	27.46
M2	1.00	1.46		M3	48.00	29.34

Figure 14: Barrier Magnitude and Frequency Mean Ranking Comparison

Barriers Magnitude Measure				Barriers Frequency Measure		
Barrier	Mean	Std Dev		Barrier	Mean	Std Dev
B8	1.47	1.42		B8	70.30	23.70
B1	0.94	1.42		B1	57.94	27.34
B3	0.60	1.68		B5	57.57	29.06
B5	0.46	1.82		B3	54.39	25.93
B2	0.26	1.43		B4	48.98	28.15
B4	-0.03	1.58		B2	45.14	25.57
B7	-0.10	1.74		B7	43.87	28.97
B6	-0.22	1.75		B6	42.34	27.06

5.2.3.2 Factor Analysis

Multiple variations of factor analysis were run on the motives and barrier magnitude items in hopes of uncovering the "IT Efficiency" and "Agility" dimensions (Marston et al., 2011, p. 177) discussed previously. Unfortunately, a "clean" convergence using confirmatory factor analysis on these two factors was not obtained. Exploratory factor analysis did not provide any better results. Depending on the rotation methods selected, convergence sometimes was not obtained. In other cases the factor patterns that emerged were not "clean", with some measures loading on multiple factors and/or the measures loading on the same factors not intuitively explainable as to their grouping.

5.3   Demographic Descriptives

Note that the following descriptives are based on the 68 observations who are VARs of

CloudERP and selected their position/job/role as either "Owner" and/or "Sales". The first two

question, (1) "What is your company's relationship with CloudERP (choose one)?", and (2)

"What is your Position/Job/Role within your company (choose all that apply)?", were used to

filter the 106 usable responses to get to the 68 observations of interest for this current study. The

overall breakdown of the 106 responses is shown in a Company Relationship by Job/Position

matrix in Table 19 below:

Table 19: Company Relationship by Position Matrix

Position \ Relationship n = 106		Company Relationship				
		VAR	ISV	VAR/ISV	Other	TOTAL
Position/ Role	Owner	41	1	8	0	50
	Sales	25	0	6	0	31
	Project Mgr	18	1	3	1	23
	Marketing	8	0	2	0	10
	Consultant	25	1	8	0	34
	Technical	6	1	5	1	13
	Other	4	1	1	0	6
	TOTAL	127	5	33	2	167

Table 19 adds up to 167 (instead of the n = 106) due to the fact that the Job/Position/Role

question is a "Choose all that Apply" questions so a single person could choose two or more

answers for that question. The cells highlighted in blue are the observations of interest in this

current study. These blue observations of interest are further broken down in Table 20: Final

Company Relationship by Position Matrix below:

Table 20: Final Company Relationship by Position Matrix

Position \ Relationship		Company Relationship		
n = 68		VAR	VAR/ISV	TOTAL
Position/ Role	Owner	41	8	49
	Sales	25	6	31
	Pre-TOTAL	66	14	80
	- Adj for Dups	10	2	12
	TOTAL	56	12	68

Note that Table 20 shows a "Adj for Dups" (Adjustment for Duplicates) line to reconcile the initial "80" pre-Total, netting out the twelve duplicate responses to get to the 68 final surveys of interest. We can see that 56 of the final subjects was an Owner and/or Salesperson from a VAR and the other twelve were Owner and/or a Salesperson from a VAR/ISV. Likewise, 49 owners are part of the final responses, 31 salespersons, and 12 classified themselves as both Owners and Salespersons.

The table below, Table 21: Descriptive Statistics for Demographics Variables, provides summary statistics for the remainder of the demographic questions and will be referenced in their corresponding section below (red highlights identify high values of Skewness and/or Kurtosis for the related demographic variable). Initially, I show tables/charts of response patterns of the demographic questions in Sections 5.3.1–5.3.8. Note that the variables highlighted in yellow are ordinal variables where distributions for each category and graphs are shown in their respective section. The variables highlighted in blue are ratio measures.

Table 21: Descriptive Statistics for Demographics Variables

Statistic \ Variable =>		Number of Employees	Time Selling ERP	Time Selling Cloud ERP	# of ERP Clients	# of Cloud ERP Sales	# of Last Year ERP Sales	Last Yr Cloud Sales %	Next Yr Cloud Sales %
N	Valid	68	68	68	68	68	67	65	66
	Missing	0	0	0	0	0	1	3	2
Mean		3.72	4.50	3.69	4.75	2.66	6.25	22.08	42.77
Median		4	5	4	6	3	4	10	40
Mode		4	5	4	6	3	2	0	50
Std. Deviation		1.78	1.14	1.37	1.79	1.30	6.79	30.34	28.89
Skewness		-0.14	-2.28	-0.52	-1.12	0.62	2.20	1.64	0.61
Std. Error of Skewness		0.29	0.29	0.29	0.29	0.29	0.29	0.30	0.29
Kurtosis		-1.29	3.94	-0.45	-0.27	0.19	4.99	1.68	-0.41
Std. Error of Kurtosis		0.57	0.57	0.57	0.57	0.57	0.58	0.59	0.58
Range		5	4	5	5	5	30	100	100
Minimum		1	1	1	1	1	0	0	0
Maximum		6	5	6	6	6	30	100	100

Finally, sections 5.3.9-5.3.13 contains a summary of some of the multiple answer and open-ended questions regarding verticals markets and industries.

5.3.1 Number of Employees

The survey question was "How Many Employees are in your Company?" This is an ordinal measure with its categories and related response numbers shown below in Table 22 and Figure 15. The kurtosis measure (-1.29) from Table 21 is more than two standard deviations. This means that the distribution of responses is relatively "flat" compared to a normal distribution. Figure 15 depicts this with the bars at the extremes above the normal curve and the majority of the bars in the middle below the normal curve.. It appears that there is a heavy "weighting" in both tails of the distribution (a lot of real small companies as well as a lot of large companies). This violates the normal distribution assumption.

Table 22: Number of Employees

# of Employees	Frequency	Percent
1-3	10	14.7
4-6	12	17.6
7-10	5	7.4
11-15	18	26.5
16-25	6	8.8
> 25	17	25.0
Total	68	100.0

Figure 15: Number of Employees
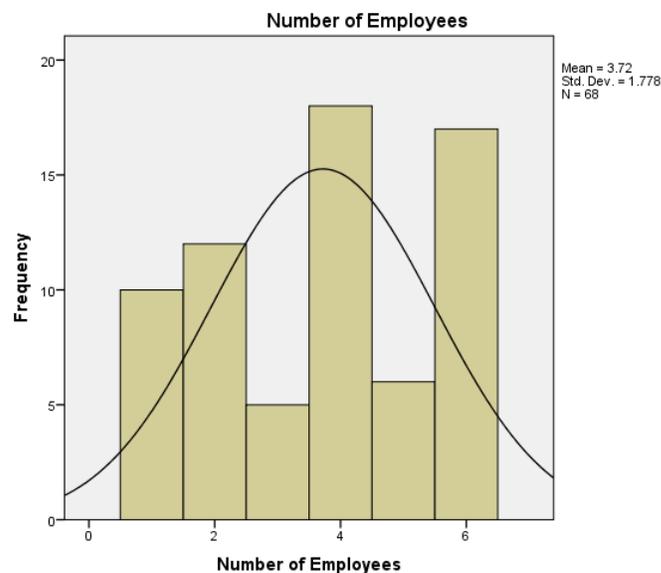
5.3.2 Time/Years Experience Selling ERP Software

The survey question was "How long has your company been selling ERP Software?" This is an ordinal measure with its categories and related response numbers shown below in Table 23 and Figure 16. The skewness and kurtosis measures for this variable from Table 21 are both red meaning that violations of a normal distribution have occurred. The distribution for this variable is heavily skewed left as can be seen in Table 23. Most of the companies/persons

selling ERP software who have responded to this current study have been doing this for a long

time (79.4% for over ten years).

Table 23: Time Selling ERP

Time Selling ERP	Frequency	Percent
1 year or less	4	5.9
2-3 years	3	4.4
4-6 years	2	2.9
7-10 years	5	7.4
> 10 years	54	79.4
Total	68	100.0

Figure 16: Time Selling ERP
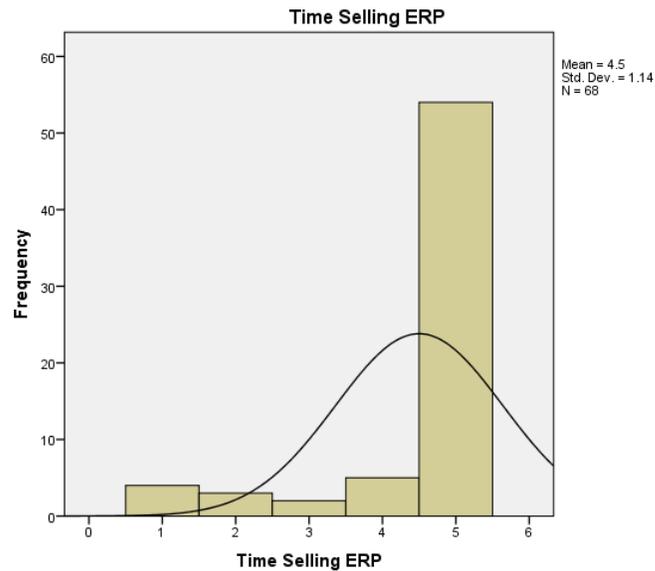
5.3.3 Time/Years Experience Selling Cloud ERP Software

The survey question was "How long has your company been selling Cloud ERP

Software?" This is an ordinal measure with its categories and related response numbers shown

below in Table 24 and Figure 17. The skewness and kurtosis measures for this variable from

Table 21 are both within tolerance levels and the distribution shown in Figure 17 support the

looks of a normal distribution.

Table 24: Time Selling Cloud ERP

Time Selling Cloud ERP	Frequency	Percent
Brand New	7	10.3
< 6 months	7	10.3
6 - 12 months	10	14.7
1-2 Years	24	35.3
3-4 years	16	23.5
> 4 years	4	5.9
Total	**68**	**100.0**

Figure 17: Time Selling Cloud ERP
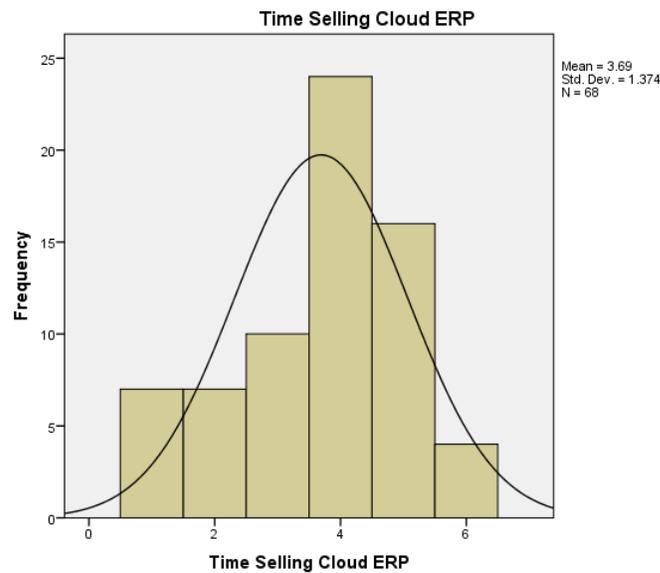
5.3.4 TOTAL ERP Client Base

The survey question was "How many TOTAL ERP clients does your company have?"

This is an ordinal measure with its categories and related response numbers shown below in

Table 25 and Figure 18. The absolute value of the skewness measure (-1.12) from Table 21 is

greater than 1 (and is also more than three standard deviations). This means that the distribution

of responses is heavily skewed left compared to a normal distribution. This is reminiscent of the

"How long have you been selling ERP software?" question which is heavily skewed left with

most companies selling ERP for over 10 years. A majority of the respondents companies

(58.8%) have more than 50 ERP clients. These results also reflect the results of the "How many

employees are in your company?" question which shows that over 50% of the companies having

more than 10 employees (and 25% of the companies having over 25 employees).

Table 25: Number of ERP Clients

# of ERP Clients	Frequency	Percent
< 5	7	10.3
5 - 10	5	7.4
11 - 20	4	5.9
20-30	6	8.8
30-50	6	8.8
> 50	40	58.8
Total	68	100.0

Figure 18: Number of ERP Clients

Number of ERP Clients

Mean = 4.75
Std. Dev. = 1.79
N = 68
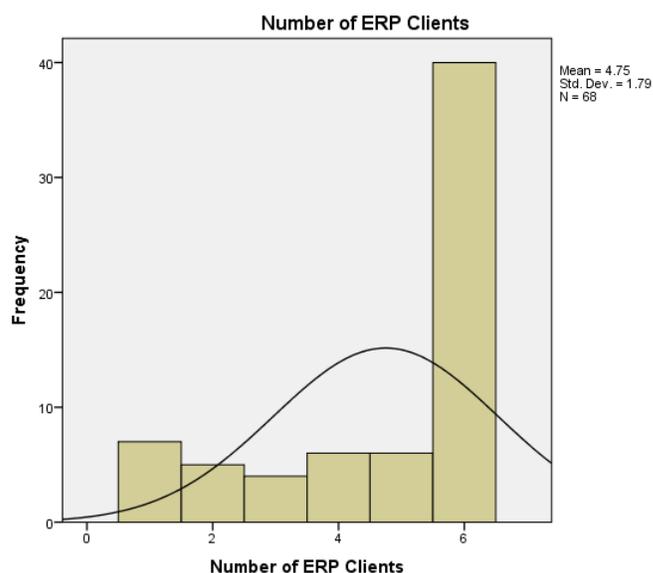
5.3.5   Cloud ERP Sales Quantity

The survey question was "How many CLOUD ERP sales has your company made?" This is an ordinal measure with its categories and related response numbers shown below in Table 26 and Figure 19. The kurtosis and skewness numbers from Table 21 do not show any alerts but the data in Table 26 and Figure 19 show that this is skewed right. Over 22% of the respondents have not had any cloud ERP sales, thus cutting off the tail on the left side of the distribution. From a visual perspective, this variable appears to violate the normality assumption.

Table 26: Number of Cloud ERP Sales

# of Cloud ERP Sales	Frequency	Percent
0	15	22.1
1 - 2	16	23.5
3 - 5	22	32.4
6 - 10	10	14.7
11 - 20	2	2.9
> 20	3	4.4
Total	68	100.0

Figure 19: Number of Cloud ERP Sales
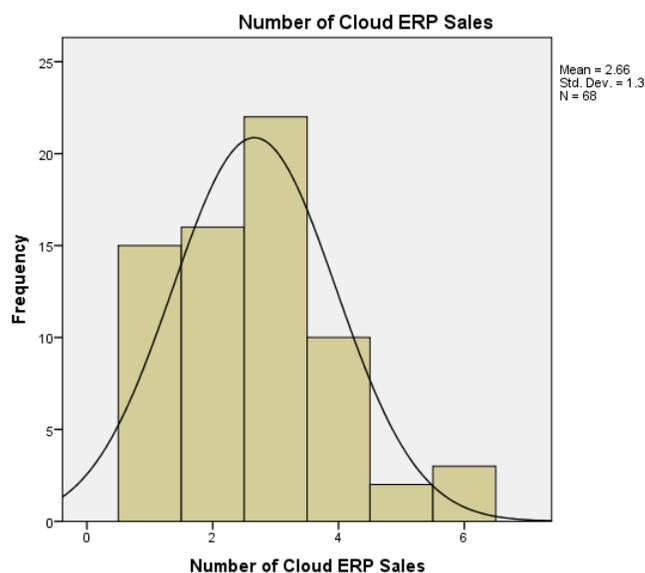
5.3.6 TOTAL ERP Systems Sold Last Year

The survey question was "How many TOTAL ERP systems did you sell LAST YEAR?" This is a ratio measure with a mean value of 6.25 (from Table 21). A histogram of the responses is shown below in Figure 20. This shows a distribution that is skewed right, with a cutoff on the left at the 0 point. It also flattens to zero then has a rise in the right tail. The kurtosis and skewness numbers from Table 21 are both highlighted in red giving warnings about the measure being non-normal. Thus, the normality assumptions for this variable are not supported.

Figure 20: Histogram of Number of Last Year ERP Sales
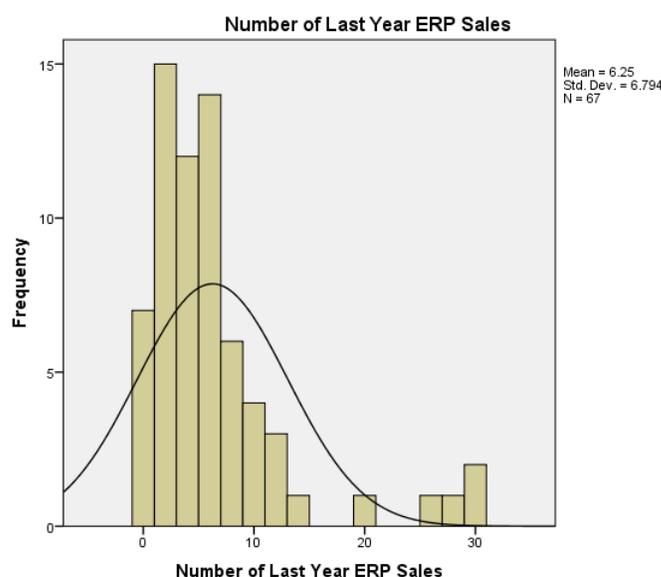
5.3.7 Cloud ERP Percentage of LAST Year ERP Sales

The survey question was "What PERCENTAGE of your LAST year ERP sales were CLOUD ERP systems?" This is a ratio measure with a mean value of 22.08 (from Table 21). A histogram of the responses is shown below in Figure 21. This shows a distribution that is skewed right, with cutoffs at the 0 and 100 points. The kurtosis and skewness numbers from Table 21 are both highlighted in red giving warnings about the measure being non-normal.

Thus, the normality assumptions for this variable are not supported. Also, from a visual inspection of the data it appears that a handful of respondents did not pick up on the term "Percentage" in this question and the next question. It appears from their "unusual" percentage numbers that they continued answering these two questions in terms of quantities instead of percentages.

Figure 21: Last Year Cloud Sales Percentage

Last Yr Cloud Sales Pct

Mean = 22.08
Std. Dev. = 30.337
N = 65
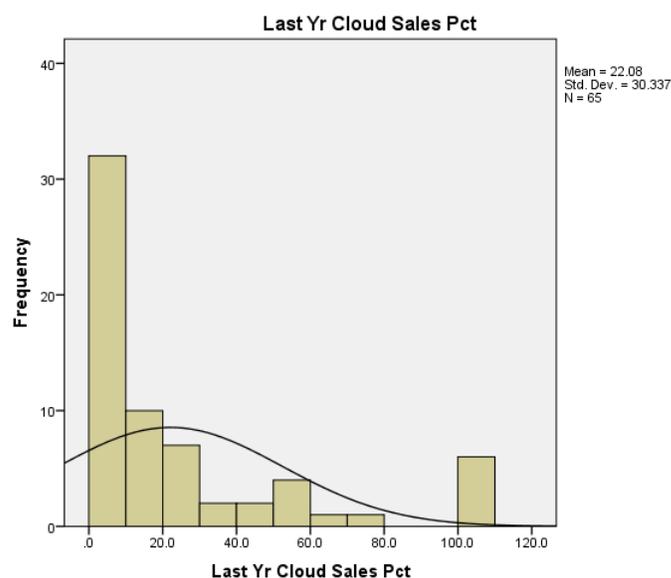
5.3.8   Cloud ERP Percentage of NEXT Year ERP Sales

The survey question was "What PERCENTAGE of your NEXT year ERP sales do you predict will be CLOUD ERP systems?"   This is a ratio measure with a mean value of 42.77 (from Table 21). A histogram of the responses is shown below in Figure 22. This shows a slightly flat distribution that is skewed right, with cutoffs at the 0 and 100 points. Although the kurtosis and skewness numbers from Table 21 do not meet the warning criteria, visual inspection of the data shows that the normality assumptions for this variable are not supported.

Figure 22: Next Year Cloud Sales Percentage
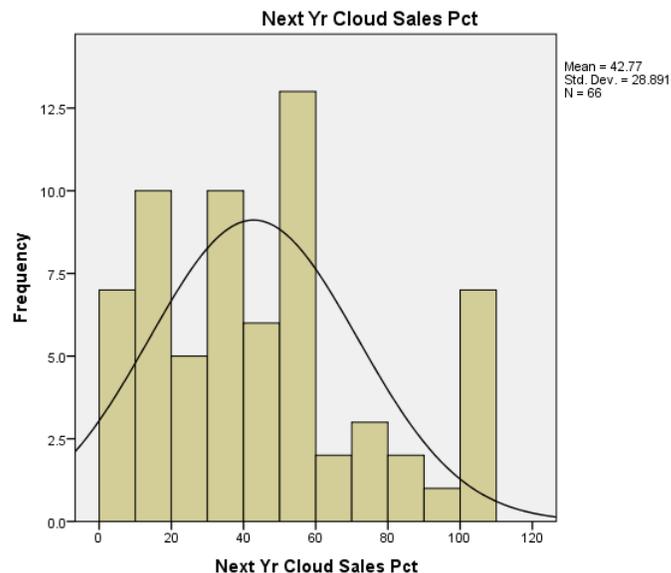
5.3.9 Specialization in any particular verticals/industries

The survey question was "Does your company target or specialize in selling ERP software in any particular verticals/industries (choose all that apply)?" Figure 23 shows the a bar chart of the responses. Note that this is a "Choose all that Apply" question so the total number of responses is greater than the 68 total survey respondents since each respondent can choose more than one answer. Table 27 lists the seven vertical/industries specified by those who chose the "Other" option.

Figure 23: VAR Specialization by Vertical/Industry
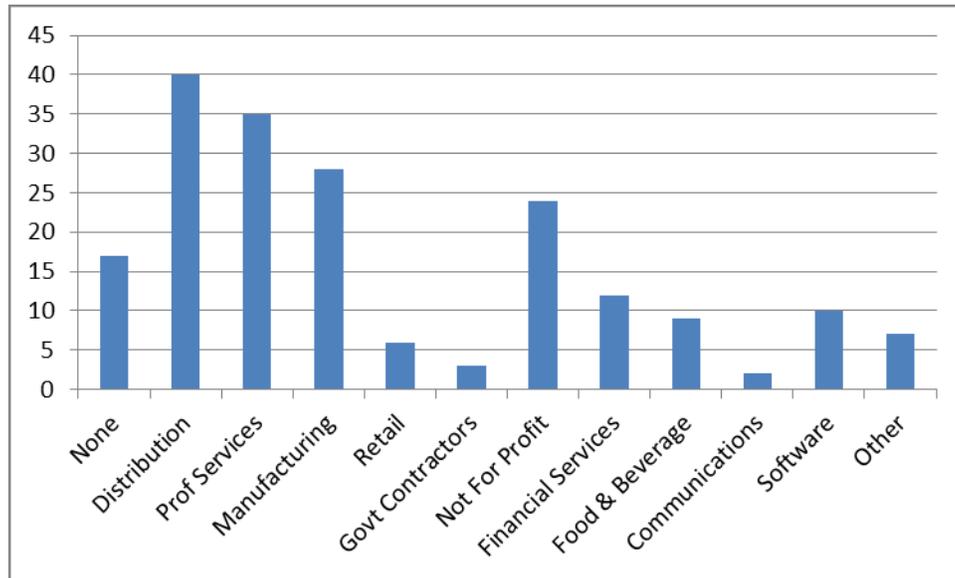
Table 27: "Other" specified Industries

Vertical/Industry
Automotive repair
Breweries
Construction
Ecommerce or etail
Government - Fund Accounting
Healthcare
Oil & Gas

5.3.10 Successful Verticals/Industries Selling Cloud ERP Software

The survey question was "What three verticals/industries have you had success in selling Cloud ERP software?" There were a total of 111 responses. Table 28 shows the responses in descending order.

Table 28: Successful Verticals/Industries

Qty	Industry/Vertical
29	Distribution
20	Marketing Professional Services
12	Not For Profit
8	Financial Services
6	Manufacturing
4	Software/Technology
2	Food and Beverage
2	Medical/Clinics
2	Oil & Gas
2	Project Accounting
1	Agricultural
1	Biotech
1	Construction
1	CRM
1	Discrete Manufacturing
1	Ecommerce or Etail
1	Education
1	Financial Reporting
1	Fitness Center
1	General Accounting
1	Governmental entities
1	Healthcare
1	Home Improvement
1	Hospitality
1	Investment Management
1	Life Sciences
1	Marketing
1	Media
1	Mining
1	MRP
1	Municipalities
1	Real estate
1	Retail
1	Video Equipment Manufacturing

5.3.11 Reasons for Success in Verticals/Industries

The survey question was "Why do you think that you have had success in selling Cloud ERP to these verticals/industries?" There were a total of 50 responses which are shown in Table 29 below. A majority of these answers mimicked or were similar to the motives (and barriers) tested in the UF. A lot of these "reasons for success" can be categorized under one of the already existing motives or barriers codes (see reason column).

Table 29: Reasons for Success in Verticals/Industries

Reasons for Success in Verticals/Industries	Reason
Minimal up front costs, ease of beginning implementation	M2,M6
Drivers were old outdated systems; Clients want more flexibility	M1,M7
Webbased ERP available anywhere anytime; Customized; ERP (CRM) enabled to double revenue and profit	M1,M7
Ease of access	M1,M7
Lots of Intelllectual Property, references and Situational Fluency	VAR
Lower cost of infrastructure, ease of maintenance for users	M4,M6, M7
No IT Dept needed	M4,M7
The customer's desire to avoid the headaches of maintaining a server and the financial means to address that goal.	M3,M7
Perceived lower cost of ownership - independent of industry.	M4,M6, M7
Ability of team members to understand the industry as well as apply previous experience in these industries.	VAR
Relationship with clients and low cost of implementation	M2,VAR
Customer satisfaction. People trust me. New opportunities come from CFO's who move around occasionally to new companies. And I watch Linked In and CFO Selections to see when other opportunities might be there.	VAR
Extensive experience selling ERP systems into these verticals over the last 16 years	VAR
Client's seek latest technology wants the ability to deploy off premise also seek flexibility in customization and Integrate with existing platforms.	M1,M7, B6,B7
This particular group has offices around the world and needed a system that could consolidate and be accessed around the world,	M1
They appreciate the lighter IT footprint	M4,M7
Client had investor cash. Client needed to have NO infrastructure. Client was aggresive.	M2,M6, M7
The success was not related to the vertical. It was due to the companies focus on outsourcing the hosting of their applications. They did not wish to have in-house servers, IT staff or have the need to manage the servers and applications internally.	M3,M7
Acumatica's platform, technology and toolset are the top in the market place.	M3,M7
Just starting but it is where our greatest knowledge/expertise lies	VAR
Becoming more popular	B3
Our experience in using these software packages	VAR
Market and needs experience	VAR
They know their pain point well. They have a budget	M4,M6
Functionality of the software	B3
Experience and market demand for cloud	VAR
Access to the data from anywhere on any device.	M1
For our sales, the specific vertical has not had any correlation to whether they purchase cloud or non-cloud.	N/A
Product Features provide enterprise productivity	M1
Flexibility in deployment and user count	M1,M7
Our company size and skill set	VAR
We have a very diversified background and can leverage that experience with these multiple industries	VAR
Multi-office, multi-national, remote workers, outsourcing mentality.	M1,M3, M7
Supportable, Customizable, Scalable.	B6,M5, M7
Expertise in working with ERP software and Business in these verticals, being able to understand client's requirement and mapping the solution	VAR
Value proposition of the cloud. Distribution expertise	M4,M6, VAR
Our experience. Software fit and functionality. Price point	B3,M4, M6,VAR
Domain knowledge and experience	VAR
Mobility and infrastructure requirements	M1,M7
The value of Total Cost of Ownership. The ability to implement quickly and without having to worry about maintaining the infrastructure as well as performing maintenance.	M2,M4, M6,M7
90% of our sales have come from referrals. Once we are referred in, we position our experience in implementing, customizing and supporting the systems to meet prospects needs.	VAR
Marketing people are familiar with the cloud and need to have access to their projects/jobs in remote locations.	M1
More technically advanced; High Growth - recognize value of outsourcing non-core functions such as infrastructure management	M1,M3, M7
Customers did not want to manage solution on site	M7
Customers had minimal IT investment.	M6
Generally startups or early stage development organizations look to Cloud first.	M2,M3, M6,M7
Strength of product/knowledge of the industry	VAR
All features in one system no add-ons	B3
Many client options with a web based application	B3,M1

In Table 29 above, I coded each of the items that was answered as "Reasons for Vertical/Industry Success" in the open-ended survey question. Most of these items "fit" into one (or more) of the existing motives and barriers that were already presented. I added a few categories for those items that did not fit into an existing motive or barrier category. Table 30 below shows a ranking of the most frequently coded motives/barriers from this analysis.

Table 30: Summary of Success Reasons

Code	Description	Count
M7	Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being externally and centrally managed by Software Vendor or Service Provider	20
VAR	VAR specific reasons	17
M1	Cloud ERP provides Flexibility and Mobility enabling Business Innovation	13
M6	Cloud ERP puchased as SaaS requires Low Capital Expenditure	10
M4	Cloud ERP Provides reduced ongoing IT Cost for the Enterprise	8
M3	Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business	6
M2	Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services	5
B3	Cloud ERP has Functionality limitations and depth due to Lack of community and ISV's	5
B6	Customization is Difficult in Cloud ERP	2
M5	Cloud ERP is Scalable On-Demand	1
B7	Integration is Difficult in Cloud ERP	1
N/A	Not Applicable	1
B1	Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP	0
B2	Traditional ERP systems have hosting options with Internet Service Provider's (ISPs) that provides many benefits touted by cloud ERP	0
B4	Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP	0
B5	More Security and Privacy Risks related to Cloud ERP	0
B8	Cloud ERP purchased as Saas ERP has perpetual ongoing Subscription expenses	0
Total		89

The most cited reason for industry success was motive seven relating to the infrastructure and systems maintenance that SaaS vendors provided. This was followed closely by VAR specific reasons, in particular, their industry specific knowledge was cited for their ability to sell CloudERP in specific verticals/industries. Then the recurring motive of "mobility and flexibility" showed up as the third reason for industry specific success.

5.3.12 Problem Verticals/Industries Selling Cloud ERP Software

The survey question was "What three verticals/industries have you had challenges or problems in selling Cloud ERP software?" There were a total of 80 responses. Table 31 shows the responses in descending order. A lot of the top industries listed below as "Challenging" also appeared in Table 28 in "Successful" industries list.

Table 31: Challenging Verticals/Industries

Qty	SUMMARY
18	Manufacturating
8	Government
7	Distribution
7	Retail
6	Financial Services
5	Software
4	Food
3	Medical
3	Service Management
2	Field Services
2	Healthcare
2	Not for Profit
1	Business Intelligence
1	Document Management
1	Ecommerce
1	EDI
1	Landscaping
1	Large resellers
1	Legal
1	Pharmaceuticals
1	POS
1	Professional Services
1	Project Accounting
1	Rental and booking agency
1	Staffing

5.3.13 Reasons for Problems in Verticals/Industries

The survey question was "Why do you think that you have had challenges in selling Cloud ERP to these verticals/industries?" There were a total of 44 responses which are shown in

Table 32 below. A majority of these answers mimicked or were similar to the barriers tested in

the UF. A lot of these "problems" can be categorized under one of the already existing barrier

codes (see reason column).

Table 32: Reasons for Challenges in Verticals/Industries

Reasons for Difficulty in Verticals/Industries	Reason
CPAs are technology laggards and still a few years behind the cloud ERP curve. Also - some accountants and IT are OK with other apps in the cloud - but still NOT ERP	Risk, B3
Not customized enough. Best of breed solutions were more productive.	B1,B4, B6
Older systems - customer isn't ready for change...too much "red tape."	Change, B1
Do not value investing in Technology	Value, B1,B4,B8
Does not fit the cloud paradigm	B3
Customer already has a server an light IT staff and total cost of ownership after 3-years is cheaper with onPremise. There still exists some fear of internet downtime or trusting that data will be kept safe and secure in some foreign hosting site.	Risk, Internet, B5,B8
Have not sold cloud ERP yet	VAR,B3
Size and age of our company	VAR,B3
I believe that to provide the best service you need to have prior experience (of some type) to provide value to the industry vertical. In my case Manufacturing would be a challenge. No experience.	VAR,B3
Clients seek a proven legacy product with many references from exiting users. Not ready to take the leap for a newer technology.	Risk,B3
In both cases OtherCloudERP was a considered more accomplished system . For the rental company it was a case of Portuguese language screens and accounting, for the software it was because the Contracts module needed to be linked to projects which it is not in Acumatica.	Vendor, B3
Older erp systems are more established. Hesitancy on the part of customers to try something new.	Risk,B4
Old school thinking.	Value, Risk,B4
Cost of the cloud ERP we sell (CloudERP) was a barrier. It could only compare to something like Dynamics GP with a user license sale of 20 to 25 users. Not viable for the typical SMB market.	Vendor, B8
Lack of functionality in the Cloud solutions. The legacy solutions have more mature offerings and are supplemented by add-on products for these verticals.	B3,B4
There's functionality that they each need specific to their industry and the product is not there yet.	B3
Cloud ERPs don't do these well	B3,B4
Lack of references	B3
It's harder due to the field service technicians (oil field workers) and being able to show an ROI which is easily calculated.	VAR
I don't think it's industry-related.	N/A
Not real knowledge and experience	VAR,B3
Regulations	Regs
Lack of functionality of the software	B3
Constraints of only cloud deployment	Vendor
Do not see Industry as a challenge in selling Cloud ERP.	N/A
For our sales, the specific vertical has not had any correlation to whether they purchase cloud or non-cloud.	N/A
Lack of features, market penetration/risk	Risk,B3
Clients desire for more established software vendors	Risk, Vendor, B3
Point Blank for CloudERP: Financial Reporting.	Vendor
The challenges is the pricing. When it comes down to the monthly fees it is still cheaper to own the software and servers.	B8
ERP software's doesn't cover the width and depth of certain verticals and without having tight integration with base makes it harder to sell and show value to customer	B3,B4
Manufacturing is not as complete as it needs to be, even though the price point is great! / Software companies tend to think they know more. / Food and Beverage tend to only go with mainstream industry specific solutions.	Risk,B3, B4
Products are not ready/mature.	B3
People still dont understand the requirements necessary for cloud tech, they are also hesitant since it is fairly new	Risk,B3
Software industry thinks that they know everything and can do an implementation by themselves. We don't target the Retail vertical and are thus not adequately equipped to sell into that space.	Imp Cost, B3
The manufacturing option is missing some key features and the total ERP package price has been an issue for both manufacturing and non-manufacturing prospects. We have not had any leads in the software world.	Vendor, B3
ERP not designed for government. Fear of losing control of data. Performance issues.	Govt, Risk, Data,B3
Typically, data entry in Cloud ERP is slower than on premise	B3
Concerns about connectivity. Reliance on internet. Security.	Risk, Internet
Functionality to connect with outside systems.	B7
Integration with WMS	B3,B7
Security and protection of proprietary data	Data,B5
Features	B3
For the smaller companies, Cloud ERP seems to be too expensive. For the larger companies which could afford it, key features are usually lacking.	B3,B8

In Table 32 above, I coded each of the items that was answered as "Reasons for Difficulty in Vertical/Industry" in the open-ended survey question. Most of these items "fit" into one (or more) of the existing barriers that were already presented. I added a few categories for those items that did not fit into an existing barrier category. Table 33 below shows a ranking of the most frequently coded motives/barriers from this analysis.

Table 33: Summary of Problem Reasons

Code	Description	Count
B3	Cloud ERP has Functionality limitations and depth due to Lack of community and ISV's	26
Risk	Risk concerns	11
B4	Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP	8
Vendor	Vendor (CloudERP) specific reasons	6
B8	Cloud ERP purchased as Saas ERP has perpetual ongoing Subscription expenses	5
VAR	VAR specific reasons	5
B1	Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP	3
N/A	Not Applicable	3
B5	More Security and Privacy Risks related to Cloud ERP	2
B7	Integration is Difficult in Cloud ERP	2
Value	Challenges assessing value	2
Internet	Internet concerns	2
Data	Data related problems	2
B6	Customization is Difficult in Cloud ERP	1
Change	Change management concerns	1
Imp Cost	Implementation Cost	1
Govt	Governmental problems	1
Regs	Problems with regulations	1
M1	Cloud ERP provides Flexibility and Mobility enabling Business Innovation	0
M2	Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services	0
M3	Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business	0
M4	Cloud ERP Provides reduced ongoing IT Cost for the Enterprise	0
M5	Cloud ERP is Scalable On-Demand	0
M6	Cloud ERP puchased as SaaS requires Low Capital Expenditure	0
M7	Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being externally and centrally managed by Software Vendor or Service Provider	0
B2	Traditional ERP systems have hosting options with Internet Service Provider's (ISPs) that provides many benefits touted by cloud ERP	0
Total		82

Overwhelmingly, the most prevalent item cited as a problem in penetrating specific vertical deals with the lack of functionality of cloud ERP software. This is expected with the

lack of maturity of such new technology and should dissipate over time. The second most cited

problem deals with risk. SME's are known to be risk averse and apparently the VARs are seeing

this in their reluctance to be on the "bleeding edge" of new technology.

CHAPTER 6: DISCUSSION

Small to Mid-size Enterprises (SMEs) typically are slow/late to adopt new technologies due to a conservative bias and cost factors. Implementation of a new Enterprise Resource Planning (ERP) system is a major, costly undertaking for a company of any size let alone SMEs, but there is the potential for huge paybacks touted by advantages afforded by the cloud. Cloud based ERP technology, especially for SMEs, is relatively new and poses a potential large risk-reward payoff. These SMEs are currently functioning with their existing systems so why would they want to risk switching to "Bleeding Edge" Cloud ERP technology?

This current study sheds light on this question and contributes to the prior ERP literature. The stream of ERP systems research is very mature but reviewers have identified a few particular research areas that are consistently cited as lacking throughout the literature relating to research applicable to SMEs, a lack of theory, and a need for research into cloud-based applications and/or SaaS offerings (Addo-Tenkorang & Helo, 2011; Grabski et al., 2011). This paper adds methodological, empirical and theoretical contributions to this existing stream of research about the motives and barriers in the selection of cloud ERP systems for SME's. In particular, this research paper proposes to help bridge these gaps by testing the UF of the motives and barriers to the selection of cloud based ERP systems by Saeed et al. (2012) using a survey of VARs of CloudERP, a SME cloud ERP system.

6.1   Methodological Contribution

From a methodological standpoint I use VARs as subjects in the survey. This is unique in studying the selection of new technology, particularly in order to assess barriers to ERP selection. In the past, adoptions of new technologies have been studied using theories such as the Technology Acceptance Model (TAM) (Davis (1989), Venkatesh et al. (2003)), Diffusion of

Innovation (DOI) (Agarwal & Prasad, 1998; Cooper & Zmud, 1990; Crum et al., 1996),

Information Success (IS) Model (Delone, 2003; DeLone & McLean, 1992); and the Marketing

Satisfaction Model applied to Application Service Providers (ASP) (Susarla et al., 2003). These

are the predominant models used in the IS literature to study the *adoption* of a wide variety of

technologies. Each of these models presumes purchase of the ERP system to measure the impact

of some independent variables (IV's; e.g., CSF's) and their impact on a dependent variable (DV)

from one of the models specified (e.g., Satisfaction, Implementation Success, etc.). These

variables would have to be measured post system selection decision. Thus, implicit in these

models is the fact that the given system has already been selected or purchased. Hence, key

variables in these models may have little relation to the actual selection decision process and

criteria since their success (or outcome) dimension relies on post-selection factors that may not

be related to the selection criteria (e.g., quality of service provider, estimate of project budget,

quality of software, etc.). Therefore, we would be looking at DV measures that most likely have

been influenced by other variables or factors introduced post system selection. In addition, these

models would be only looking at "adopters" who decided to select (purchase or adopt) the

software. By using these models we would never get any feedback or measurement of potential

barriers to selection by "non-adopters" (lost customers) who chose not to purchase the ERP

system.

Similarly, prior ERP research has focused primarily on an ERP's implementation success

and the relevant critical success factors (CSFs) important throughout the various stages of an

ERP's lifecycle (Addo-Tenkorang & Helo, 2011; Grabski et al., 2011; Schlichter &

Kraemmergaard, 2010). The focus of these studies has been on post-selection variables and the

success or failure of the ERP's adoption or implementation. Inherent in these studies are firms

who already selected ERP technology, which provides no insight into any potential barriers that

prevent selection. Also, the dependent variable (DV) in these studies has typically been the success of the implementation or customer satisfaction which is heavily influenced by a multitude of CSF's and other factors that may not reflect the actual criteria (or motives) used for the selection decision.

To address this measurement timing issue, this current study proposes using Value Added Resellers (VARs) of SME Cloud ERP software (CloudERP) as subjects in the study. The use of VAR's better serves the purpose of this current study, which is to explore the motives and barriers of Cloud ERP software selection which occur and are captured earlier in the decision process (pre-purchase). VARs have the expertise, experience and are in contact with both prospects (who turn into customers or purchasers) and non-purchasers during the sales cycle. Arguably, the VARs are in the best position to evaluate and provide feedback about both the motives as well as barriers to the Cloud ERP selection decision. This is especially important in uncovering barriers to selection, which, by definition, cannot be studied during the software implementation phase, which occurs post software selection.

6.2   Theoretical Contribution

I constructed a survey to test and assess the constructs of motives and barriers presented in the by Saeed et al. (2012) UF. I converted the motives and barriers presented into statements that are measured on a seven-point likert scale ranging from disagree to agree. Then I subjected these motives and barriers to face and validity checks (Trochim, 2008) via three expert VARs as well as CloudERP personnel. Based on the expert VARs and CloudERP feedback, one motive was dropped since it was not applicable to CloudERP's business model. Also, three barriers that were deemed no longer relevant or applicable were removed. More importantly, three additional barriers were identified and added to the UF during this process.

Thus, the theoretical UF by Saeed et al. (2012) was operationalized as a survey and tested in the field which has not been done. Additional benefits of this process accrued during the face and content validity checks. Experts in the field provided feedback that led to additions to and deletions of motives and barriers in the UF to reflect the current cloud ERP market environment.

Table 34 below shows the final UF model tested in the study and the overall results ("Sig" column). This can be used as a starting point for future researchers to use and test for changes in the rapidly evolving technology phenomenon called the cloud that we are now experiencing.

Table 34: Final UF Tested

Code	Motive	Sig
M1	Cloud ERP provides Flexibility and Mobility enabling Business Innovation	Yes
M2	Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services	Yes
M3	Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business	Yes
M4	Cloud ERP Provides reduced ongoing IT Cost for the Enterprise	Yes
M5	Cloud ERP is Scalable On-Demand	Yes
M6	Cloud ERP puchased as SaaS requires Low Capital Expenditure	Yes
M7	Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being externally and centrally managed by Software Vendor or Service Provider	Yes

Code	Barrier	Sig
B1	Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP	Yes
B2	Traditional ERP systems have hosting options with Internet Service Provider's (ISPs) that provides many benefits touted by cloud ERP	No
B3	Cloud ERP has Functionality limitations and depth due to Lack of community and ISV's	Yes
B4	Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP	No
B5	More Security and Privacy Risks related to Cloud ERP	No
B6	Customization is Difficult in Cloud ERP	No
B7	Integration is Difficult in Cloud ERP	No
B8	Cloud ERP purchased as Saas ERP has perpetual ongoing Subscription expenses	Yes

6.3   Empirical Contribuition

The results and findings from the survey provide insights into the motives and barriers of cloud ERP software selection. All seven motives tested in the survey are supported as shown in Table 9: Tests of Differences for Motives. These motives span the major trends and shifts touted as benefits of the cloud. "Cloud computing represents a convergence of two major trends in information technology: (a) IT efficiency, … and (b) business agility" (Marston et al., 2011, p.

177). It represents both a technology and an economic shift in an organization's use of IT resources, offering the potential for significant savings in both IT expenditures and resources (Rosenberg & Mateos, 2011). In a rapidly changing, competitive marketplace products and skills become outdated, especially with the pace of technological advancements. SMEs have limited resources and are at a disadvantage. "Cloud computing has the potential to play a major role in addressing inefficiencies and make a fundamental contribution to the growth and competitiveness…[of] SMEs" (Sahandi et al., 2013, p. 1). This new strategy provides for business agility and acts as a catalyst for more innovation allowing SMEs to implement new strategic ideas at a faster pace in order to gain a competitive advantage over their competition (Sahandi et al., 2013). Overwhelmingly, the VARs surveyed agreed with all of the espoused motives of cloud ERP selection.

On the other hand, VARs only agreed with three of the eight barriers to cloud ERP selection that were tested in the survey as shown in Table 14: Tests of Differences for Barriers. Of these three significant barriers, two of them (barriers B3 and B8) were added as a result of the face and content validity checks with the expert VARs and personnel from CloudERP from this current study.

Barrier B3 is significant. This barrier relates to the cloud ERP functionality limitations and product depth due to lack of community and ISV's. This should be somewhat expected for new technology, especially in the early stages. This type of barrier (B3) is always going to be an issue with newer technology as it takes time for members of a community (e.g., customers, vendors, consultants, users, etc.) to get up the learning curve, accept, adopt, figure out their roles, etc. Over time I would anticipate that this barrier slowly erodes as the market grows and matures.

Barriers B1 (already have invested too much in their current system) and B8 (perpetual and/or ongoing SaaS subscription expenses) both deal with cost factors. B1 sounds very similar to the "sunk cost phenomenon". The decision to continue operating with their current system, sinking money into upgrades, patches, and add-on products versus investing in a new ERP system are typical symptoms of an "Escalation of Commitment" situation. This would be interesting to further investigate and see how much this sunk cost "trap" plays a role in hindering the SME selection decision process.

Barrier B8 impacts a TCO analysis. This is very similar to an individual's decision to buy or lease a car. Leasing a car was (and still is) slow to catch on and is not for everyone. Vendors need to be careful about how the ongoing subscription costs compare to the traditional model of purchasing the software upfront. One VAR mentioned as a comment in the additional barriers section that "Although it is difficult to highlight all the costs associated with maintaining a server in-house, the typical small to medium sized business sees the cost of SaaS far exceeding the cost of traditional on Premise [traditional ERP] after about 3-years." This break-even period is particularly susceptible to the currently low interest rate environment where SME business owners might rather finance and purchase the ERP software upfront versus the ongoing subscription costs required by SaaS.

These barriers may reflect cost constraints and risk aversion of SMEs. "Due to their limited resources, budgets and their high sensitivity to costs, when SMEs take the first step into implementing an ERP system, they need to think about many things, foremost the cost of adoption. Literature suggests that most ERP implementations fail due to inaccurate and optimistic budget and schedule estimations, as well as, anticipating indirect costs beforehand is problematic" (Haddara, 2012, p. 250). Elragal and Haddara (2010) state "sometimes benefits in relation to costs are not important or unattainable. For example, when an SME's budget is

crossed, it does not matter how much benefits it will gain through dedicating more money to the

project, as it might be out of the required resources already" (p. 99). ERP implementations are

notorious for cost overruns. Switching to a cloud ERP system still entails a relatively big, initial

upfront cost of an implementation. This represents risk, especially to any prospective purchaser

that has had a previously painful ERP implementation experience.

Lastly, another factor may be the result of SMEs inability to accurately value the benefits

accruing from IT Efficiency and Cloud ERP agility. This would definitely impact a TCO

analysis. From the results of the Sahandi et al. (2013) study, it seems that the potential

advantages of cloud computing exist for SMEs to reduce costs and increase agility but it may

take some time for the bandwagon phenomenon to occur since knowledge and awareness of

cloud computing must increase. It will also take time for SMEs to gain trust and confidence with

the vendors and to gain confidence in security issues (Sahandi et al., 2013). Also note that "risk"

was identified in the open-ended questions for (a) "Additional Barriers" (see Table 16), and (b)

"Reasons for Problems in Verticals/Industries" (see Table 33). To help reduce this

risk/uncertainty and more accurately assess the potential expected benefits of a new cloud ERP

technology/system, the following three major actors in this community can improve by:

1) **VARs**: increase product knowledge; increase technical knowledge; capitalize on industry/vertical specialization/knowledge and expertise
2) **SMEs/End Users**: dedication and commitment to learning/understanding and valuing technology and change, increase company's dynamic (sophistication and innovation) capabilities; understand how to capture benefits; understand how to value benefits
3) **Software Vendors**: increase the quality and reliability of the software, increase product knowledge (of VARs and End Users) through training, documentation, manuals, etc., create software that is easy to customize and integrate; make the software understandable/intuitive and easy to use; continue investment on innovation in and flexibility of the software; provide SaaS pricing that properly and fairly incorporates current interest rate and risk so pricing and payback is in line with traditional purchasing options (i.e., "perpetual" or purchase upfront licensing options)

Overall, having all motives supported and only three of the eight barriers (of which only one was from the original Saeed et al. (2012) UF) shows that a shift in cloud ERP technology is occurring. This points to cloud ERP technology becoming more dependable and that the public's understanding, awareness and reliance on this new technology has increased.

6.4   Contribution to Practice

Finally, this current study was conducted as an engaged scholarship project. I worked with CloudERP and expert VARs in order to look at, modify, and operationalize the Saeed et al. (2012) UF framework of motives and barriers to the selection of cloud ERP systems. This will help provide insight for VARs and the software vendor, CloudERP, into what motivates purchasers of their software and more importantly, what obstacles or barriers prevent prospects from buying. A knowledge of the barriers will help VARs know how to navigate these obstacles during the sales cycle.

After completion and/or as a follow-up to this current study, I will work with CloudERP to develop a win/loss questionnaire or survey to be administered to a VAR after each lead is closed (either in a sale or lost opportunity). Also, if possible the actual lead will be asked to complete a similar questionnaire or survey so we can get more direct observations for a further, in-depth study. Collection and analysis of this type of data at "closure" of the lead will further help CloudERP better understand and manage their lead pipeline, and in turn help them prepare and train their VAR network on selling Cloud ERP software to SMEs. The more frequent and timely collection of this information will help overcome the "smoothed" or average responses of the VARs captured in this current study.

CHAPTER 7: CONCLUSION

7.1   Recommendations for Future Research

Technology changes occur swiftly, more rapid than the research publication process

occurs. By the time studies are conducted and publications result, chances are technology has

changed or morphed into the next stage leaving current research out of date. For example,

already "social ERP" is being mentioned as an adaptation to address integrating social media into

the organizations overarching ERP system. Due to rapid changes such as these, a more efficient

way to disseminate this information needs to be addressed.

Also, Cloud ERP is here to stay. This phenomenon impacts multiple disciplines, from

Information Systems to Accounting to even Management, Operations, and Organizational

Behavior. More theory and a more comprehensive theoretical framework needs to be used to be

able to address all of these disciplines needs. Swanson and Ramiller (1997), p. 462, present an

"Institutional Production of Organizing Visions". This model discusses the idea of the

Organizing vision as a "community discourse". Of particular interest to our study is the

"Innovation Adoption and Diffusion" process. Swanson and Ramiller (1997), pp. 467-468,

discuss this in detail:

> "Although a variety of players makes up the discourse community, the organizing vision
> specifically addresses the application of technology within prospective adopter
> organizations…even here the organization rarely acts alone [(e.g., vendors, consultants,
> subcontractors, etc.)]…Their experiences in implementation…provide feedback through
> various channels into the community discourse that builds the organizing
> vision…Diffusion also has important reciprocal effects on the development of the
> organizing vision…From the adopter's point of view, the organizing vision provides a
> "solution" of some kind, but it is an unfinished one that must be assembles and tailored to
> fit the particular organization's situation."

Such a comprehensive framework and viewpoint would provide a good lens to view a major technological change as it swiftly moves through its' lifecycle and impacts and/or is impacted by a variety of players within a community.

Lastly, classification of SMEs is typically defined by one of several different metrics such as total revenue (ranging anywhere from less than $50 million or even less than $100 million in annual sales), number of employees (ranging anywhere from less than 250 or even less than 500 employees) and/or ownership structure. There is not a consistent definition of a SME and these criterion often vary by industry. Companies that are included in the SME classification can vary drastically in size and nature. For example, the nature of sophistication, technology requirements and budget for an ERP system of a ten person firm with $1 million in sales differs drastically compared to that of a company with 250 employees and $50 million in revenue. This is too large of a market segment to be treated as homogeneous. While this study changes the focus away from traditional ERP research which has been primarily concerned with larger firms, future ERP research needs to have finer divisions within the SME ERP market.

7.2   Limitations

Since this engaged scholarship study is working with only one company (CloudERP), the subjects are going to be VARs of only one particular brand of cloud ERP software. This brings with it the typical external validity threats associated with a typical field survey. That is, there will be generalizability issues if trying to extend the results of the study to motives and barriers in the selection of other cloud ERP software.

Also, cloud ERP offerings (as do traditional ERP) differ between vendors. For example, CloudERP has more advanced, hybrid purchase options: (1) SaaS (rent the software and hosted/maintained by CloudERP), (2) Perpetual (purchase the software and host/maintain where you like), and (3) Subscription On Premise (SOP; rent the software and host/maintain where you

like). The variety of purchase choices that CloudERP provides allows for a wide variety of deployment options (e.g., SaaS with CloudERP, private cloud, public cloud, hybrid cloud) that most other typical cloud ERP systems do not have or allow for (either as an option or by applying the strict cloud definition). These options from this particular vendor may have introduced results that magnified differences from standard cloud software offerings, which by NIST definition, require SaaS and multi-tenancy (not implemented by CloudERP).

Lastly, this current study utilizes VARs as subjects as conduits of information that they are assessing from contact with their leads during the sales process. The survey answers will be "smoothed" or averaged perceptions made by the VARs about their prospective leads (some purchasers of the software and some not).

CHAPTER 8: REFERENCES

8.1   Appendix A – Additional ERP Selection Papers

Table 35: Additional ERP Selection Papers

Authors	Type of Study	Companies	Selection Factors/Processes Considered	Summary/Comments/Abstract
Stefanou (2001)	Literature review combined with 9 Interviews	N/A	13 Strategic Level Factors 12 Operational Level Factors 5 Requirements vs. 10 Constraints ERP Product, Vendor and Support Services Evaluation	The evaluation has to be both quantitative and qualitative and requires an estimation of the perceived costs and benefits throughout the life-cycle of ERP systems.
Verville and Halingten (2002b)	Case study	Large - 4 companies	Influence of Users most notable 5 Prominent Characteristics emerged	This paper focuses on the influences and characteristics of the enterprise resource planning (ERP) acquisition process (ERPAP).
Bryson and Sullivan (2003)	Theoretical /Analytical	N/A	7 General Risk Items 5 Vendor Risk Items	They develop a framework of transaction costs for ERP outsourcing to ASPs. They then set up an analytical model for evaluation of ASP contracts using TCE.
Verville and Halingten (2003a)	Case study	Large - 4 companies	Table of Internal Information Sources Table of External Information Sources	The focus of this paper is on the information search process and its sources which affected the acquisition process.
Verville and Halingten (2003b)	Case study	Large - 4 companies	Planning Information Search Selection Evaluation Choice Negotiations	This paper depicts the six principal processes and many of the constituent activities, issues, dynamics, and complexities that pertain to the acquisition of ERP software. The results from this study contribute to the identification of processes that are part of this type of acquisition.
Wei and Wang (2004)	Theoretical /Analytical	N/A	Project FactorsSoftware System FactorsVendor Factors	This paper presents a comprehensive framework for combining objective data obtained from external professional reports andsubjective data obtained from internal interviews with vendors to select a suitable Enterprise Resource Planning (ERP) project. Ahierarchical attribute structure is proposed to evaluate ERP projects systematically. In addition, fuzzy set theory is used and an example provided.

Luo and Strong (2004)	Theoretical Framework; Case Study Application	Universities	Process Change Capabilities of Org Technical Change Capabilities of Org Customizability of Software	They advance a framework for supporting management decision-making about customization choices and the capabilities required to accomplish them. They identify various customization possibilities for business processes, as well as ERP systems and the technical capabilities required for technical ERP customization options and process change capabilities needed for process customization.
Wei et al. (2005)	Theoretical Framework; Case Study Application	N/A	Fundamental Objective HierarchySystem criteriaVendor criteria	This study presents a comprehensive framework for selecting a suitable ERP system. The Analytical Hierarchy Process framework can be used to construct the objectives of ERP selection to support the business goals and strategies of an enterprise, identify the appropriate attributes, and set up a consistent evaluation standard. A real-world demonstration shows feasibility.
Baki and Çakar (2005)	Literature Review, Survey plus Interviews	59 Turkish Manufacturers	Functionality Technical Criteria Cost Service and Support Vision System Reliability Compatibility with other systems Ease of customization Market Position of the Vendor Better Fit with Org Structure Domain Knowledge of Suppliers References of the Vendor Fit with Parent/Allied Org Systems Cross-Module Integration Implementation Time Methodology of the Software Consultancy	Survey results determined that fit with parent/allied organization systems was most important criteria. Other significant factors were cross-module integration, compatability with other systems and references of the vendor.
Verville et al. (2005)	Case study	Large - 3 companies	Acquisition Process Factors:Planned and Structured ProcessRigorous ProcessDefinition of all RequirementsAccurate InformationPeople Related Factors:Clear and Unambiguous AuthorityCareful Selection of the Acquisition Team MembersPartnership ApproachUser ParticipationUser Buy-In	Studying three companies that recently completed the acquisition process, they identified ten factors critical to the successful outcome of acquiring an ERP solution.
Deep, Guttridge, Dani, and Burns (2008)	Literature review and practical experience in managing selection process	Make to Order SMEs	Plan Identify Evaluate Select	Develops a selection framework for Made to Order (MTO) SMEs. A workbook is developed to provide a structured ERP selection process.

Uzoka, Abiola, and Nyangeresi (2008)	Survey	Varies	TAM Information Success Model Significant Variables: System Quality Information Quality Software Support Firm Size	The article examines the selection of ERP by organizations using an extension of the technology acceptance model (TAM) using elements of the information systems (IS) success model. The study evaluated the impact of system quality, information quality, service quality, and support quality as key determinants of cognitive response, which influences ERP system purchase/use.
Venkataraghavan and Sundarraj (2011)	Literature Review	N/A	Application Oriented CriteriaService Oriented Criteria	They take a look as SaaS based ERP (SERP) and develop a SERP selection framework by integrating characteristics from both the underlying SaaS and ERP application.

8.2   Appendix B – Hosted vs. On-Premise vs. Cloud ERP Framework

Table 36: Hosted vs. On-Premise vs. Cloud ERP (Duan et al, 2013)

Relevant Distinctive Features	Cloud-based ERP	Hosted ERP	On-premise ERP
Direct Costs			
Lower upfront costs (hardware, user licenses, implementation, excluding training and customization)	xxx	x	
Lower operating costs and efforts (energy, maintenance, configuring, upgrades, IT staff costs)	xxx	x	
No non-depreciable subscription fees		x	xx
Impact on Competitive Advantages and Organization			
Scalability (highly elastic infrastructure capacity), faster time to market	xxx		
Rapid implementation, easier to switch among IT providers	xxx	x	
Enables enhanced focus on core competencies	xx		
Higher level of independency from the ERP provider			xx
Minimized loss of IT skills and IT staff resistance to changes			x
Functionality & Usability			
Functionally rich to satisfy the back-office needs of organizations in all types of industries		xx	xx
Rapid acquisition of bug fixes and new functionality	xxx		
Improved accessibility, mobility, and usability	xxx	x	
Integration & Customization & Performance Capabilities			
Enables extensive customization and complex integration		xx	xx
Easier integration with other cloud services	xx	x	
Improved system disaster recovery and availability	x	x	
Low dependency on deficiency of network reliability and speed			xxx
Ease of retaining on-premise legacy systems			xxx
Easier integration with on-premise systems that require low latency			xx
Allows hybrid deployment strategy to incorporate 3 features above		xx	
Security & Standards			
Enables high level of security and confidentiality	x	xx	xxx
Clear data damage liability and SLA conditions			x
Easier compliance to data & environmental regulations		x	xx

Legend

x   referred to (deduced from) only in one source, or pertinent only partially, or has noticeably contradictive references

xx   referred to (deduced from) in 2 to 5 sources

xxx   referred to (deduced from) in more than 5 sources

8.3   Appendix C – SaaS ERP Advantages/Disadvantages Framework

Figure 24: SaaS ERP Advantages (Hoseini, 2013)

ID	Description
	Strategic
S1	Focus on the core business
S2	Increased flexibility
S3	Increased bargaining power of the SaaS user and ability to switch across SaaS providers
S4	Lower IT barriers to innovation
*S5	Run the business more globally
*S6	Helps SaaS users' business go mobile
	Financial
F1	Reduced requirement of large up-front investment
F2	Low initiation cost
F3	Shifting IT spending costs from capital expense to operational expense
F4	To save technology costs
F5	To save staff costs
	Technical
T1	Access to state-of-the-art technology
T2	Easier access to technical expertise of SaaS provider
T3	Shorter and easier product development cycle and its implementation
T4	Software service is externally and centrally managed by SaaS provider
T5	Moving toward green IT and smarter usage of energy
T6	Having access to stronger and cheaper security protection facilities
*T7	ERP as SaaS has the same necessary functionalities as on-premise ERP
*T8	ERP as SaaS provides traceability and consistency between different parts of the system in order to work seamlessly

Figure 25: SaaS ERP Disadvantages (Hoseini, 2013)

ID	Description
	Strategic
S1	Loss of governance
S2	Vendor lock in and dependence on SaaS provider
S3	Loss of critical resources and capabilities
	Financial
F1	Paying more than agreed subscription fee in order to reach expected level of service
F2	Hidden costs in the contract
F3	Not considering cost of SaaS integration with legacy systems by the beginning of service usage
T1	Under expected level of application availability
T2	Lack of seamless interoperability with in-house applications as well as other vendor's services
T3	Developing customized features in house based on the deficiencies of SaaS application
T4	Uncertainty of not having a scalable service
T5	Loss of technical knowledge
T6	Increased security risks in terms of data locality, data integrity, data access, data breaches, data privacy, data confidentiality and, authentication and authorization

8.4 Appendix D – Cloud ERP Final Survey

Georgia State University Research Study - Motives and Barriers to Cloud ERP Selection

Informed Consent Form

Purpose:
You are invited to participate in a research study. The purpose of the study is to investigate Motives and Barriers to Cloud ERP Selection in Small to Midsize Enterprises (SMEs) from a VARs Perspective. You are invited to participate because you are employed by a VAR of Acumatica. A total of 650 participants will be recruited for this study. Participation will require 15-20 minutes of your time to complete the survey.

Procedures:
If you decide to participate, you will be required to fill out an on-line survey.

Risks:
In this study, you will not have any more risks than you would in a normal day of life.

Benefits:
Participation in this study may not benefit you personally although you may voluntarily submit your email address for aggregated summary results from the study. Overall, we hope to gain information about the primary motives and barriers to Cloud ERP selection in order to help SMEs allocate their resources to technology more efficiently and effectively.

Voluntary Participation and Withdrawal:
Participation in research is voluntary. You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may skip questions or stop participating at any time. Whatever you decide, you will not lose any benefits to which you are otherwise entitled.

Confidentiality:
We will keep your records private to the extent allowed by law. Dr. Michael Gallivan and research team will have access to the information you provide. Information may also be shared with those who make sure the study is done correctly (GSU Institutional Review Board, the Office for Human Research Protection (OHRP)). We will use a key (code) rather than your name on study records. The information you provide will be stored in a password- and firewall-protected computers. A key (code sheet) to identify the research participant will be used. The key (code sheet) will be stored separately from the data to protect privacy. The key (code sheet) will be destroyed after a period of three years. Your name and other facts that might point to you will not appear when we present this study or publish its results.

The findings will be summarized and reported in group form. You will not be identified personally.

Contact Persons:
Contact Michael Gallivan at mgallivan@gsu.edu or 404-413-7363 if you have questions, concerns, or complaints about this study. You can also call if you think you have been harmed by the study. Call Susan Vogtner in the Georgia State University Office of Research Integrity at 404-413-3513 or svogtner1@gsu.edu if you want to talk to someone who is not part of the study team. You can talk about questions, concerns, offer input, obtain information, or suggestions about the study. You can also call Susan Vogtner if you have questions or concerns about your rights in this study.

You may print a copy of this consent for your records if you like. By completing and submitting this survey, you are indicating your consent to participate in the study.

Thank you in advance for your time and participation.

Print

I have read, understood, and optionally printed a copy of, the above consent form and desire of my own free will to participate in this study.

○ Yes, I consent to participate in study

○ No, I do not want to participate in study (note that this option will end the survey immediately without being able to return)

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Once you begin the survey, please **use the arrow at the bottom of each page to move to the next page**. Note that once you complete and leave a page, your answers are recorded and you cannot return to prior questions. **Please do not use the forward and back arrows in your browser.**

You can stop working on the survey by closing your browser and return to it by clicking the link that originally brought you to it. You must be at the same computer where you started the survey. After you begin, you will have the earlier of one week or until January 31, 2014 to finish the survey.

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The following questions will give you an opportunity to tell us more about you and your company.
Please answer with your best guess/approximation.

What is your company's **relationship with Acumatica**?

○ Reseller (VAR)

○ ISV

○ Reseller (VAR) and ISV

○ Other

[   ]

What is your **position/job/role** within your company (**choose all that apply**)?

☐ Owner

☐ Sales

☐ Project Manager

☐ Marketing

☐ Consultant

☐ Programmer/Technical

☐ Other

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Georgia State University Research Study - Motives and Barriers to Cloud ERP Selection

How **many employees** are in your company?

○ 1-3
○ 4-6
○ 7-10
○ 11-15
○ 16-25
○ >25

How long has your company been **selling ERP software**?

○ 1 year or less
○ 2-3 years
○ 4-6 years
○ 7-10 years
○ > 10 years

How long has your company been **selling Cloud ERP software**?

○ Brand new
○ < 6 months
○ 6 months - 12 months
○ 1-2 years
○ 3-4 years
○ > 4 years

How many **TOTAL ERP clients** does your company have?

- ○ < 5
- ○ 5-10
- ○ 11-20
- ○ 20-30
- ○ 30-50
- ○ > 50

How **many CLOUD ERP sales** has your company made?

- ○ 0
- ○ 1-2
- ○ 3-5
- ○ 6-10
- ○ 11-20
- ○ > 20

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How many **TOTAL ERP systems did you sell in the LAST YEAR** (enter a **whole number with your best approximation**)?

Click in field to enter #

What **PERCENTAGE of your LAST year ERP sales were CLOUD ERP systems**?
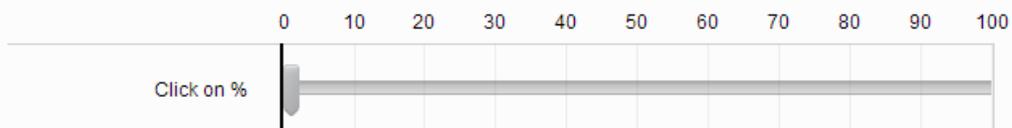
	0	10	20	30	40	50	60	70	80	90	100

Click on %

What **PERCENTAGE of your NEXT year ERP sales do you predict will be CLOUD ERP systems**?

	0	10	20	30	40	50	60	70	80	90	100

Click on %

>>

0% [███   ] 100%

qualtrics
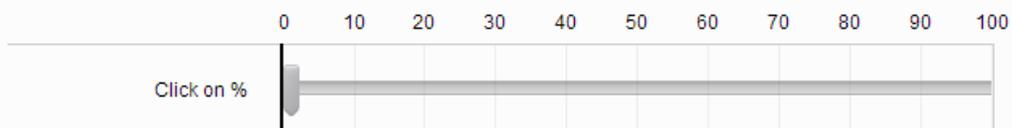
Does your company target or specialize in selling ERP software in any particular verticals/industries (choose all that apply)?

- ☐ No, we sell to all industries without real specialized focus
- ☐ Distribution industry
- ☐ Professional Services
- ☐ Manufacturing industry
- ☐ Retail industry
- ☐ Governmental contractors
- ☐ Not for Profit
- ☐ Financial Services
- ☐ Food & Beverage
- ☐ Communications & Media
- ☐ Software Industry
- ☐ Other (please specify additional vertical(s) below)

Please **list up to three verticals/industries** that you have had **success in selling Cloud ERP Software** (in order of success):

Vertical 1	
Vertical 2	
Vertical 3	

Why do you think that you have had success in selling Cloud ERP to these verticals/industries (brief explanation please)?

Success Reasons

Please **list up to three verticals/industries** that you have had **challenges or problems in selling Cloud ERP Software**:

Vertical 1

Vertical 2

Vertical 3

Why do you **think that you have had challenges in selling Cloud ERP** to these verticals/industries (brief explanation please)?

Challenge Reasons

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Qualtrics

MOTIVES

Please select the **extent to which you agree/disagree** that the items listed below are
Motives (Incentives or Advantages) for selecting a Cloud ERP System.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
Cloud ERP provides Flexibility and Mobility enabling Business Innovation	○	○	○	○	○	○	○
Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services	○	○	○	○	○	○	○
Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business	○	○	○	○	○	○	○
Cloud ERP Provides Reduced Ongoing IT Cost for the Enterprise	○	○	○	○	○	○	○
Cloud ERP is Scalable On-Demand	○	○	○	○	○	○	○
Cloud ERP puchased as SaaS requires Low Capital Expenditure	○	○	○	○	○	○	○
Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being Externally and Centrally Managed by Software Vendor or Service Provider	○	○	○	○	○	○	○

Please **List any Additional Motives (Incentives or Advantages) for selecting a Cloud ERP system** that you feel are important and are **not listed above (or comments** regarding the ones listed above). **Type "none" if no additional Motives.**

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BARRIERS

Please select the **extent to which you agree/disagree** that the items listed below are
Barriers (Objections, Disincentives or Disadvantages) for selecting a Cloud ERP system.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP	○	○	○	○	○	○	○
Traditional ERP systems have Hosting Options with Internet Service Providers (ISPs) that provides many benefits touted by cloud ERP	○	○	○	○	○	○	○
Cloud ERP has Functionality Limitations and Depth due to Lack of Community and ISV's	○	○	○	○	○	○	○
Current Traditional ERP and Other Systems already Support Business Strategy so No Need to Invest in Cloud ERP	○	○	○	○	○	○	○
More Security and Privacy Risks are related to Cloud ERP	○	○	○	○	○	○	○
Customization is Difficult in Cloud ERP	○	○	○	○	○	○	○
Integration is Difficult in Cloud ERP	○	○	○	○	○	○	○
Cloud ERP purchased as Saas ERP has Perpetual Ongoing Subscription Expenses	○	○	○	○	○	○	○

Please **List any Additional Barriers (Objections, Disincentives or Disadvantages) for selecting a Cloud ERP system** that you feel are important and are **not listed above (or comments** regarding the ones listed above). **Type "none" if no additional Barriers**.

>>

0% 100%

qualtrics

PROSPECTS SELECTION CRITERIA

What **Percentage of your Prospects** considers the issues listed below to be an **Important Selection Criterion** in their **Purchase Decision for a Cloud ERP System** (click on respective %'s below)?

Low % Selection Criteria						High % Selection Criteria				
0	10	20	30	40	50	60	70	80	90	100

Cloud ERP provides Flexibility and Mobility enabling Business Innovation

Cloud ERP provides Rapid Implementation which allows a company Faster time to Market for their Products and Services

Cloud ERP purchased as SaaS allow users to Concentrate on their Core Business

Cloud ERP Provides Reduced Ongoing IT Cost for the Enterprise

Cloud ERP is Scalable On-Demand

Cloud ERP puchased as SaaS requires Low Capital Expenditure

Cloud ERP purchased as Saas has advantage of providing High Technical Reliability since it is being Externally and Centrally Managed by Software Vendor or Service Provider

\>\>

0% 100%

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PROSPECTS SELECTION CRITERIA

What **Percentage of your Prospects** considers the issues listed below to be an **Important Selection Criterion** in their **Purchase Decision for a Cloud ERP System** (same as last question with different list of issues)?

Low % Selection Criteria   High % Selection Criteria

0   10   20   30   40   50   60   70   80   90   100

Already Invested too much into On-Premises ERP and Other Systems so they do not want to buy Cloud ERP

Traditional ERP systems have Hosting Options with Internet Service Providers (ISPs) that provides many benefits touted by cloud ERP

Cloud ERP has Functionality Limitations and Depth due to Lack of Community and ISV's

Cloud ERP has
Functionality
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Current Traditional
ERP and Other
Systems already
Support Business
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Invest in Cloud ERP

More Security and
Privacy Risks are
related to Cloud ERP

Customization is
Difficult in Cloud ERP

Integration is Difficult in
Cloud ERP

Cloud ERP purchased
as Saas ERP has
Perpetual Ongoing
Subscription Expenses

>>

0% 100%

Q qualtrics

Georgia State University Research Study - Motives and Barriers to Cloud ERP Selection

If you wish to receive preliminary, summarized findings from the results of this study please enter your email address below:

Click box to enter email address

Please provide any additional comments or feedback that you may have to help improve this survey and results.

This concludes our survey. Acumatica and Georgia State University sincerely thanks you for your participation!
Please click arrow below to record your last answers above and to complete the survey.

>>

0% 100%

Q qualtrics

Georgia State University Research Study - Motives and Barriers to Cloud ERP Selection

We thank you for your time spent taking this survey.
Your response has been recorded.

0% [████████] 100%

8.5   Bibliography

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