

A Systematic Snapshot of Small Packaged Software Vendors' Enterprises (SPSVEs)

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ABSTRACT: *To Small Packaged Software Vendors' Enterprises (SPSVE) have played a massive role in a software environment and contributed dramatically to economies. The purpose of this paper is to investigate and categorize the most recent of literature addressing The Small Packaged Software Vendors' Enterprises through Systematic Snapshot Research in order to identify current research topics and highlight some areas needing more consideration. The pattern of our systematic approach is based on developing a classification scheme which targets a collection of papers published within the period of 2007-2017. We analysed one hundred and one papers in peer-reviewed conferences, journals, and workshops to examine the current state of SPSVE's research in order to provide Systematic Snapshot Mapping (SSM) that includes the small packaged software life cycle, research methods used, and country of study. The Systematic Snapshot of 101 papers reveals that the majority of the literature has focused on the planning and implementation phases of (SPSVEs). Figuring a new model of packaged software life-cycle in SMEs will occur by applying the model of our categorizations with regard to the life cycle with its factors and sub factors. Moreover, it will contribute to finding research methods, regions, top ten citation, articles type classifications, and other kinds of classifications. This research is targeted to Small Packaged Software Vendors' Enterprises (SPSVEs). Our finding is intended for software research areas more than economic research areas. This paper has presented a high degree of benefits in order to assist researchers in evidence-based decision making in terms of investigating hot research areas in line with the Small Packaged Software Vendors' Enterprises (SPSVEs).*

Keywords: Small Packaged Software, Systematic Snapshot, Literature Review, Packaged Software in SMEs

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1. Introduction

In recent years, a vast knowledge has been fashioned in terms of how companies influence software engineering (SE) through a dramatic number of empirical studies and investigations [1, 2]. In addition, since 2004, an Evidence-Based Software Engineering (EBSE) by Scientific Literature Reviews (SLRs) is concerned of precise problems that occurred from the nature of software engineering and software types [3]. It offers distinction between packaged software and bespoke software, which vary depending on development teams, developing approaches, and type of stakeholders [4].

Although software development companies have implemented packaged software (PS) to its customers, the characteristics of their software products are the key to competitive features in the software industry. In fact, packaged software meets the particular demands of customers in terms of software customization and keeping up with the customer needs. There are a variety of customizations from one customer to another, resulting in different difficulties and challenges during its usage.

In other words, packaged software (PS) has formed a significant value in the world of economics. Moreover, software packaging vendors have considerable competition between them to be consistent with their newest product updates seeking to fulfil customers' satisfaction according to the features and also the costs in PS market. In this paper, we followed a variant of the structural procedures of our Systematic Snapshot Mapping (SSM) method is derived from Raza [5] systematic snapshot, and Haddara literature reviews [6].

The main criteria of gaining a high-level in a particular field of researches is based on Systemic Methods (SM) which classify and categorise the relevant research literatures according to the various schemes [7, 8]. In our study, we conducted a systematic snapshot mapping process to investigate the area of packaged software, especially in small software enterprises in several areas in line with software engineering community issues. The European Commission (EU) classifications have produced the concept of small to medium-sized enterprises (SME) that are divided into three types according to the size of the enterprises (Micro, small, small to medium), and they are extremely substantial target in the world of economy side [9].

Briefly, we classify the very recent small packaged software literatures in the next section. Others sections are organized as follows: Section 2 introduces our research approach in further detail; Section 3 introduces the findings; Section 4 briefly summarises our results by concluding s this paper; Section 5 presents the references.

2. Material and Method

This section presents the investigation method is used to gather resources regarding the current literature on SPSVEs using the Systematic Snapshot Mapping (SSM) method. To classify this literature, we allocate a research time period between January 2007 until August 2017. This study followed guidelines produced by Petersen [7] for carrying out the systematic mapping studies.

Regarding the method of classifications in this paper, we present a new driven approach of classification is fit with packaged software lifecycle which has taken from Shaul [10]. All preceding researchers have been used the packaged software lifecycle based on agenda classification research in 1999 for the large enterprises [11]. However, we conducted a new model of classifications which presented in 2012 by Shaul [10] that's suitable for SPSVEs investigations.

Regarding visualisation of data, we used bar graphs, network analysis graphs, tables, and other informative shapes representing the data. Based on Raza and Haddara [5, 6, 12] we have integrated structures to represent our data and procedures to gather a systemic snapshot of the values of this work that are useful in the rapid growth in the research literature.

2.1 Research Questions

The following research questions were established for this study:

- 1) *What are the investigation areas of small package software vender?*
- 2) *What are the issues, locations, dates, years of publish, research methods and other classifications investigated of conducting the study?*
- 3) *How is research being carried out in small packaged software in regard to methods and approaches?*

2.2 Search Strategy

In order to address the topics generally with a limited time, our search strategy designed by procedures; the first step selects the well-known search keywords from SPSVEs as systematic literature reviews and mapping studies. The second step identifies the scope of investigation. Moreover, the Scopus database has played a massive role in updating the keywords to ensure their leverage. The initial run in search engines is given by the remarkable keywords in fig 1. In addition, search strings present the relevant studies and retrieve the findings of search in the second run. The last string of keywords is utilized to cover as many variations of the same term as possible, as shown in figure 1 below.

("Small Packaged Software Enterprises" or "Small ERP systems" or "Market-Driven Software in Small Enterprises" or "Off-The-Shelf Small Enterprises" "SME Software Enterprises")" or ("software" or "information systems") or ("ERP systems in SMEs" or "Very small software enterprise") or ("VSE Packaged Software")

Figure 1. List of keywords used as search strings

2.3 Data Sources and Retrieval

In this section, we assigned data sources in the domain of work that is within the scope of our systematic review. This is based on sources derived from extremely significant journals with relevant studies, such as Elsevier, IEEE Xplore, Springer Link, the ACM Digital Libraries, Wiley, ACIT, IJEIS, and others. Furthermore, we managed the number of keywords to meet the scope of our investigations and to find suitable sources in the area. The period of investigation from 2007 until 2017 carried out in the search published in English and sourced through a peer-reviewed title, abstract, and keywords in the literature. We conducted investigations on the first results. Shortly afterwards, the results of the search have been considered in the inclusion process.

2.4 Inclusion Process

We conducted the processes in a way of restricting our scope by searching through overall databases. Further, titles then abstracts were the first step in the peer-reviewed, and then the keywords of the papers. After all, we initiated the work in order to be fit with our investigations scope to increase our database in extra primary studies. The other steps removed the duplicated studies and stored the remaining papers to notice the full texts. The sequential steps and processes in our investigation, summarized in the fig.2, shows the number of papers we reached in the final search.

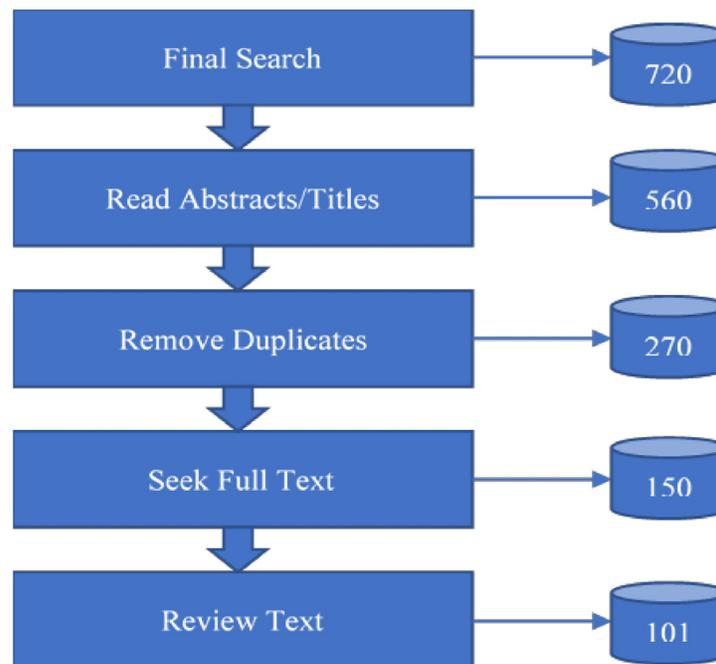


Figure 2. List of Inclusion Process with no. of papers

2.5 Data Extraction and Synthesis

Based on Petersen approach [7], we built our data extraction and synthesis using the systemic snapshot method classification scheme. The following procedures have been used to categorize the study: research approach, research method, factors, the level of analysis, sourcing phases and locations. These procedures are assisted in discovering whether or not utilised, or associated with, or concentrated on SPSVEs. Every article has focused on analysis, which was how the keyword of Small

Packaged Software Vendors' Enterprises (SPSVE) could be distributed in the content regarding classifications based on sample results.

3. Results And Discussion

This section demonstrates the classifications have been given in the previous studies, our new classification schemes for one hundred and one papers based on the special lifecycle for SMEs, factors, sub factors in the main work. In other hands, the statistical classifications based on years of publishing, targeted countries, research method types, publishers, and article types.

3.1 Classifications based on Small Packaged Software Life Cycle

This section presents the previous classifications of literature reviews that were based on, and the new classifications to the SPSVEs based on this paper. Each classification in the previous packaged software literature review at SMEs has used large packaged software lifecycle such as research agenda classifications in phases and dimensions; adoption decision, acquisition, implementation, use and maintenance, evolution, and retirement [11]. For example, Haddara Literature Review papers [6, 12].

However, we disregard the existing agenda framework strategy and present a new structure of classifications for packaged software in SMEs that presented in figure 2. We also used a new lifecycle for Small Packaged Software (SPS) which is considered the comprehensive success model for small packaged software. It contains specific phases; (Planning, Implementation, Stabilization, Backlog, New module, Major upgrade), and fifteen constructs for the six phases as main factors and then derived from the main factors other sub factors for every phase which presented by Shaul classifications [10].

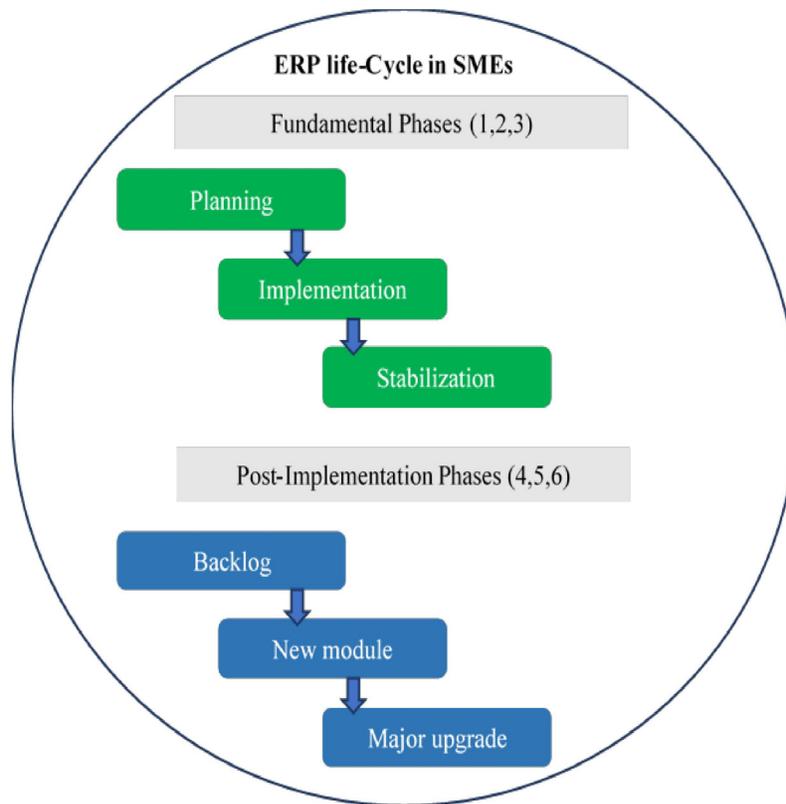


Figure 3. The model of packaged software life-cycle at SMEs

3.2 Findings by Life-Cycle Phases

This section illustrates the information about the number of papers classified according to the packaged software life cycle at SMEs phases (Planning, Implementation, Stabilization, Backlog, New module, Major upgrade), and the data presented in figure 3. Overall, implementation gained an upward trend while the backlog phase gained the downward of the number of paper

classifications. Although the classifications initially had the upper values in the planning phase and implementation, they sharply decreased in other phases. In the beginning, planning phase classifications gained 25 papers were less than implementation phase of 5 papers. The classifications sharply decreased to the 16 papers in stabilization phase, and it showed the backlog phase slightly declined in 1 paper less than the stabilization. The new module and the major upgrade increased to the 17 papers.

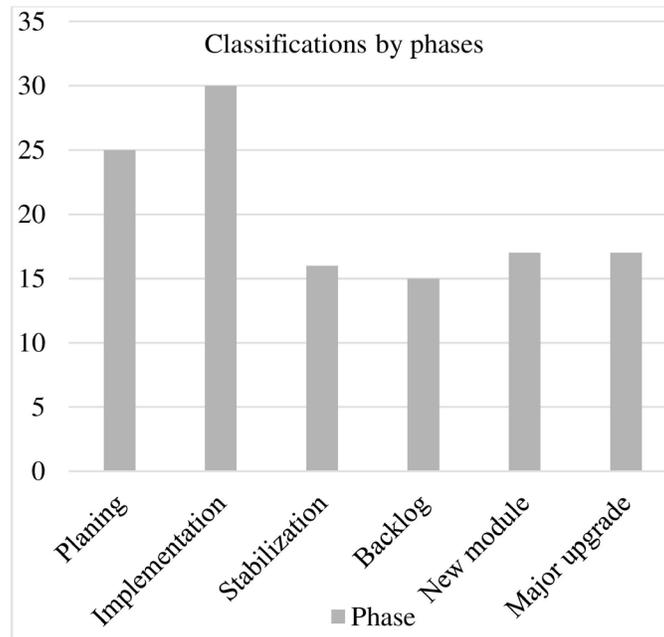


Figure 4. Classifications by phases

1) Planning Phase Classifications: This phase is considered the first fundamental phase in the packaged software life cycle at SMEs that is supporting the critical guidelines and decisions making in the implementation [10]. It also covers the business cases, user requirements, usage scenarios, operational requirements and system requirements. Hence, the target of this phase is preventing and problem-solving to any potential failure in any phase of the cycle. This section presents the topics and issues of new categorization model of small packaged software that resulted during our categorizations to one hundred and one papers in this area in table 1 below.

2) Implementation Phase Classifications: This phase is considered the second fundamental phase in the packaged software life cycle at SMEs that is carried out in different roles by the current system design, functionality and use them to produce and develop a packaged software. Hence, the aim of this phase is applying the best principles roles to success the production issues. In order to gain a better effect in the implementation phase, we classified the one hundred and one papers for the articles reviewed, referred to table 2 below.

3) Stabilization Phase Classifications: This phase is considered the third fundamental phase in the packaged software life cycle at SMEs that is release production level by improving the solutions of quality to be fit with the acceptance criteria. According to Chen in 2006 [71], the old production is to be replaced by the new production, aiming to the transforming the data and training the end-user. This phase is also covering the new system proficiency through system repair, extension and transformation, and high quality of end-user’s work. This section presented the calcifications of the Stabilization phase according to the articles reviewed that have covered its factors and sub-factors through the classifications of 101 papers in table 3 below.

4) Backlog Phase Classifications: This phase is considered the first post implementation phase in the packaged software life cycle at SMEs that is covering the process of improvement and the values of cutting inventory and logistics expenses in line with minimum perceptible interests like a simplified systems support, increased flexibility to adapt to external changes, and increased system reliability [10]. According to the Motiwalla in 2012 [81], there is a gap between actual functionality and the benefits are predictable definitely in the packaged software through the process of the adaptation and enhancement after its first

Phase	Factors	Sub-Factors	Ref.
Planning	Data Management	Study data requirements	[4, 13, 14]
		Analyse information flow	[14, 15]
	Organization Characteristics	Argue the case of ES	[16-20]
		Let all stakeholders the chance to air their views	[13, 21]
		Evaluate organizational maturity	[22]
	Education and Training	Train decision makers	[23-25]
	Support of Top Management	Make sound decisions	[24-32]
		Allocate adequate resources	[27, 28, 33]
	User Involvement	Assign users' delegates with excellent knowledge of organizational processes	[34]
	Strategy and Methodology	Analyse different implementation strategies	[35, 36]
	Education and Training	Train decision makers	[26]
	Vendor	Learn the corporate business processes, industry best practices and vendor processes and vision	[4, 35, 37, 38]
	Environment	Analyse the industry's level of differentiation	[24, 39]
	Monitoring	Define achievements indicators	[40-43]
	Software Development	Plan overall ERP architecture	[44]
Strong attention to techniques, skills, integrated legacy and third-party systems		[45]	
Enterprise System	Prefer business process reengineering rather than customization	[46]	

Table 1. Planning phase classifications

Phase	Factors	Sub-factors	Ref.
Implementation	Project Management	Track progress and risks involved	[45, 47, 48]
		Avoid scope creep	[13]
	Monitoring	Develop performance measures	[49-54]
	Education and Training	Acquire external expertise	[33]
		Develop users training programs	[55]
	Software Development	Appropriate modelling methods	[11, 14, 30, 43, 56-63]
		Plan process customization certification	[64]
	Environment	Analyse the desired flexibility to balance corporate willingness to adopt ES	[6, 12, 15, 19, 39, 53, 58, 62, 63, 65-67]
	Change management	Develop business justification	[53, 68]
Vendor	Establish vendor's support framework	[60, 61, 69, 70]	

Table 2. Findings for classifications of implementation phase

Phase	Factors	Sub-Factors	Ref.
Stabilization	Change management	Exhibit a “project success”	[34, 72-75]
	Data management	Perform quality tests	[76]
	Project team competence	Customize critical issues only	[64]
		Make ad hoc usage of specialists	[38]
	Environment	Give priority to improvements that enhance the ES flexibility supporting quick adjustments	[37, 77]
	Support of top management	Bring the organization into alignment with decisions	[26, 38, 58, 78]
	Enterprise system	Make an effort to fulfil critical performance measures	[50, 51]
	Enterprise system selection process	Gap analysis of basic fit to the organizational business process and information needs	[79, 80]

Table 3. Findings for classifications of stabilization phase

implementation to fulfil the user satisfaction in line with expectations and requirements in backlog phase. In order to expand the informative reviewed literature in the backlog phase, we classified the 101 papers to obtain the results in given table below.

Phase	Factors	Sub-Factors	Ref.
Backlog	Project Management	Knowledge transfer	[59]
		Set work plans for future versions	[20]
	Organization Characteristics	Enable all organizational stakeholders to be updated, develop high level of usage and efficacy	[21, 58, 82]
	Data Management	Extend users training for data accuracy procedures	[34]
	Enterprise System Selection Process	Performing post-implementation gap analysis of the current ERP fit	[24, 79, 83]
	Support of Top Management	Make efforts to exploit capabilities and eliminate limitations	[55, 84]
	Monitoring	Monitor system support metrics	[85]
	Education and Training	Develop a tailored training	[86]
		Ongoing training support	[86]
	User Involvement	Support with on job training	[87]
Environment	Analyse own ability to alter new rules of competition and leverage new ways to outperform rivals	[45, 88]	

Table 4. Findings for classifications of backlog phase

5) New Module Phase Classifications: This phase is considered the second post implementation phase in the packaged software life cycle at SMEs which is supplementary phase to ensure the strength of the packaged software when it will be the essential thing in the organization regarding with the changes that may happen for the organization to achieve worthy values like the business process improvements, strategic decision making and customer responsiveness by Bharadwaj in 2007 [89]. In addition, this phase is a beneficial phase for next system generation that is clearly planned and executed during the higher releasing versions from the vendors sequentially. Indeed, the results will generate a new application in the current operating system by recognizing the extra activities and risks in the previous fundamental phases in the packaged software life-cycle at SMEs. Regarding with presenting the beatifically information to the researchers according to the reviewed literature in the new module, we classified the 101 papers to get the results in given table below.

Phase	Factors	Sub-Factors	Ref.
New module	Project	Analyse objectives and expected outcomes in light of existing ES, corporate strategy, legacy system, future standardization and regulations	[24, 46, 72, 73]
	Enterprise system	Study lessons of former implementation	[88]
	Monitoring	Define monitoring measures for unsolved obstacles that affect new module implementation	[90]
	Strategy and methodology	Analyse strategy in light of previous implementations	[31, 39, 91, 92]
	Software development	Proper tools, techniques and skills for data clean-up and migration	[14, 56]
	Support of top management	Analyse outcomes of integrated ES	[73, 93]
	Project team competence	Strengthen the project team with relevant to module personnel and consultants	[18]
	Enterprise system selection process	Analyse different modules implementation taking into account multiple vendors and infrastructure considerations	[94, 95]
	Organization characteristics	Ensure the coordination and cooperation of all stakeholders affected by new module implementation	[96]
	Change management	Manage political stresses and changes in organizational focus	[78]

Table 5. Findings for classifications of new module phase

Phase	Factors	Sub-Factors	Ref.
Major Upgrade	Organization characteristics	Analyse the experience gained throughout initial implementation	[87, 99]
		Analyse specific organizational challenges	[83, 100, 101]
	Support of top management	Understanding that today technology becomes legacy tomorrow	[69, 80]
	Project team competence	Consult former project team representatives that gather critical knowledge	[16, 82, 102]
	Software development	Analyse the benefits of reducing the existing customizations, enhancements and operational cost	[64, 87, 103]
	Environment	Analyse changes in environmental uncertainties	[104]
	Change management	Organizational understanding of the importance of infrastructure upgrades	[87, 67, 105]
	Enterprise system	Study lessons of former implementation	[96]
	Education and training	Train organizational opinion leaders on long-term impacts	[106]
	Monitoring	Ensure former users' satisfaction	[106, 107]
	Data management	Define applications needed for data management	[30, 108]

Table 6. Findings for classifications of major upgrade phase

6) Major Upgrade Phase Classifications: This phase is the last phase of packaged software life cycle at SMEs which is covered the post-implementation process (Shaul, 2012). In addition to that, this phase concerns of the system upgrades according to the vendor supports. According to the Ågerfalk in 2009 [97], the issues related to the fix” and outstanding “bugs” the ERP vendor upgrades must ensure best practices or design weaknesses support in line with financial and human resources. In others hand, El-Amrani concerned of developing gradually effects of expanding the scope of the packaged software modules in the packaged software versions upgrade [98]. In this section, we present brief classifications of 101 papers articles reviewed in major upgrade phase which resulted in the given table 6.

3.3 Classifications based on Years of Publish

In this section, we extracted the data from the one hundred and one of database papers by finding the publishing date for each paper, and then gathered them in eleven years of published groups.

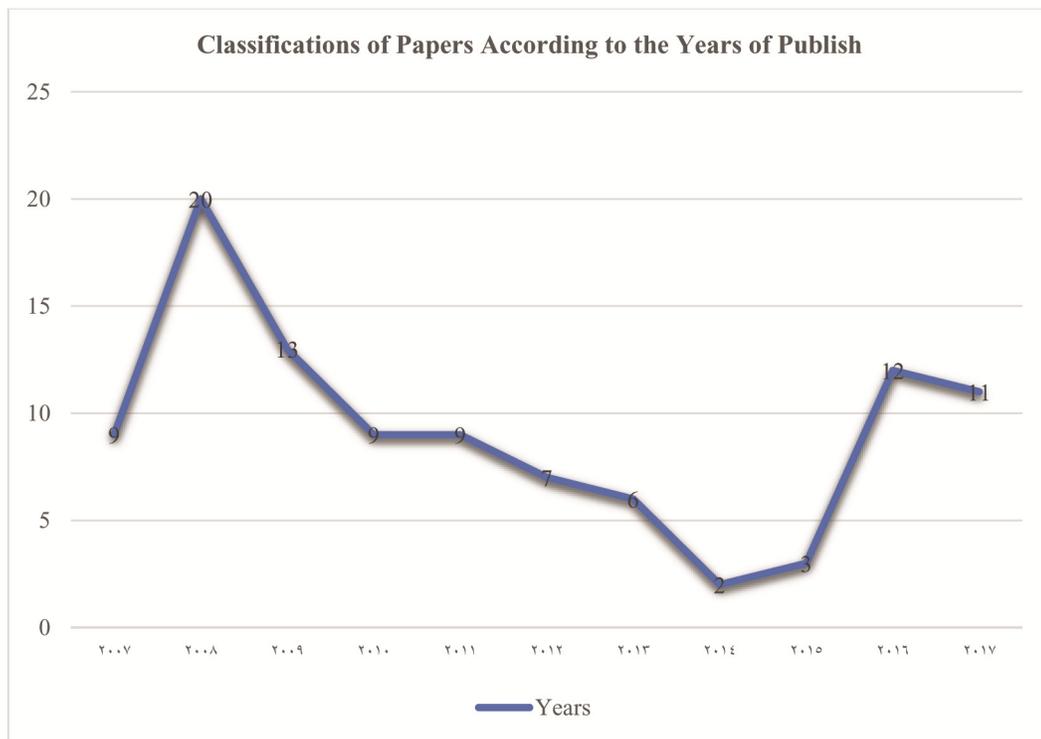


Figure 5. Findings of years of publish

Figure 5 illustrates the paper analyses results in terms of years of publishing from 2007 to 2017. Overall, the ratio of classifications in 2008 is the highest number, while 2014 had the lowest number of the results. In 2005, the ratio was 9 papers, and then the ratio dramatically grew to reach a peak at 20 papers in 2008. From 2009 until 2014, the results declined to 2 papers. However, in 2015, the ratio increased just one paper, and then it sharply grew up to reach 12 papers in 2016 and 11 papers in 2017.

3.4 Classifications based on Targeted Countries

This section presents the results of papers classified through 33 countries locations, and other papers as global locations. The table below presents the papers of our database by the targeted worldwide locations.

Summarized the information by extracting the data from the one hundred and one papers in our database. However, the table revealed that the highest number of papers had been found in India. Hence, it is evident that the SPSVEs are very important to the local side.

His section presents the findings of classifications by locations as the map graph. It deals with the maximum location of papers based on in the degrees of the colours to the minimum. In figure 6, we present the map graph for the targeted countries.

Country	#	Country	#	Country	#
India	12	Germany	2	Chile	1
Spain	6	Canada	2	Netherlands	1
China	6	Sweden	2	Colombia	1
Greece	5	Ireland	2	Argentina	1
Malaysia	5	Austria	2	Portugal	1
UK	6	Croatia	1	California	1
Taiwan	4	Finland	1	Switzerland	1
Australia	4	Vietnam	1	Illinois	1
Turkey	3	Kenya	1	Italy	1
Thailand	2	Jordan	1	Nigeria	1
Romania	2	North America	1	Qatar	1

Table 7. Findings for classifications based on targeted countries

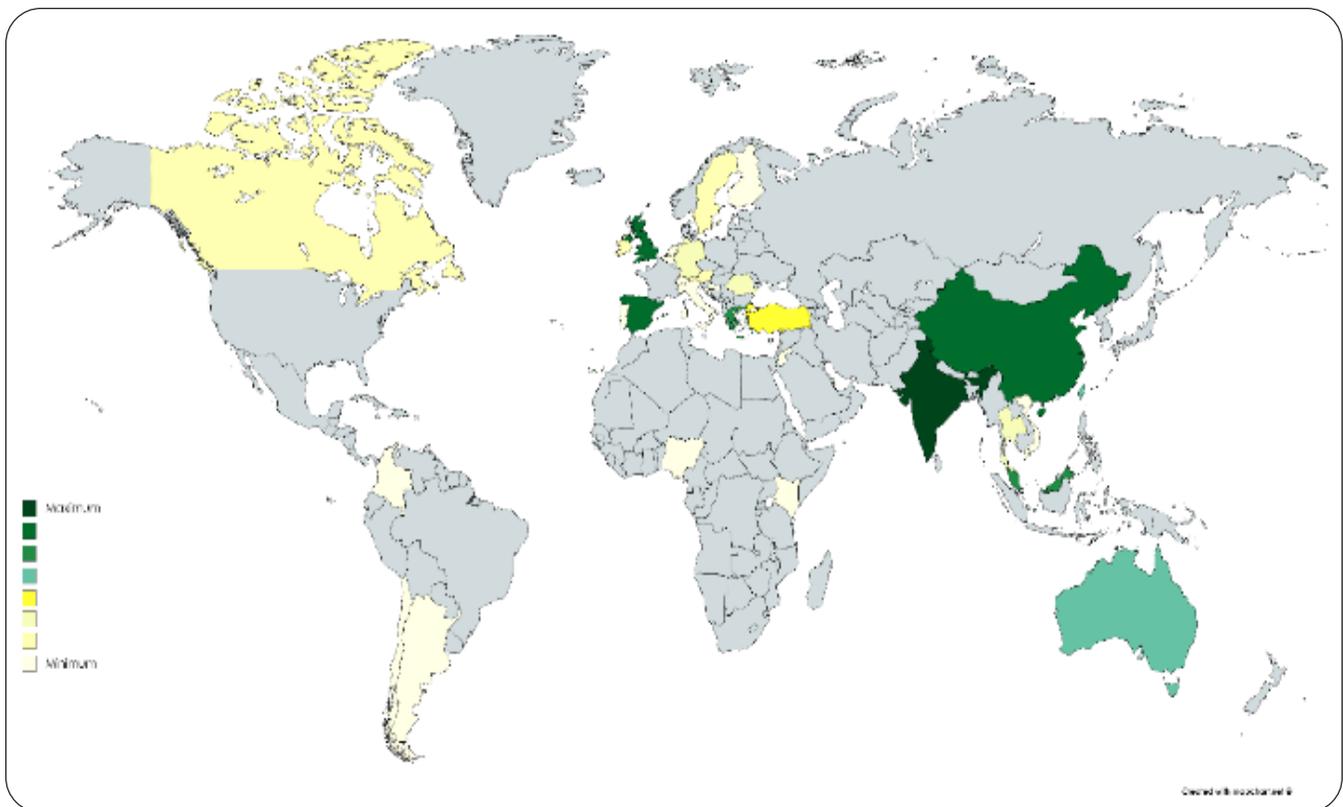


Figure 6. Map graph for targeted countries

3.5 Classifications Based on Papers Citations

Most researchers prefer the papers that have the highest number of citations, and the citations have advantages may indicate to the importance and usage of the article. This section listed the top ten citations of the papers between 2007 to 2017 in the area of our investigations. The given table presents the findings of top ten citations were between 306 until 121 citations.

3.6 Classifications Based on Publishers

Publishers worldwide such as Scopus, ISI, or other rankings are moving to expand their content in line with levels of paper quality. Moreover, the place of publication is an essential thing to the researchers as well; major researchers are looking to

Paper Ref.	Year of Publish	Citation No.
[50]	2009	306
[58]	2009	292
[37]	2008	265
[82]	2010	199
[34]	2009	199
[33]	2007	198
[41]	2009	142
[15]	2007	138
[102]	2010	127
[27]	2008	121

Table 8. Findings for classifications based on top ten papers citations

choose the best place with several contents that cover a wide range of academic disciplines in our domain. In order to the data extractions in the overall our databases articles, we focused on Journals and Conferences as outlets for publication. The given table below shows the results to the overall our database of articles. Regarding the journals, the highest number of publications was the Emerald Insight publisher, but in Conferences was the IEEE publisher.

Publisher	#	Publisher	#
Journals			
Emerald insight	26	IGI Global	1
Elsevier	9	HRČAK	1
Springer	6	Covenant University Repository	1
Inder science Online	4	INDJST	1
Wiley Online Library	3	IAJIT	1
AISEL	3	SCITECH	1
Taylor & Francis Online	2	CCSENET	1
SSRN	2	Researchers World	1
IJMSE	1	Insight society	1
SDMIMD	1	CARI	1
IJARCSMS	1	MDPI	1
TCoB& MEIS	1	QUESTIA	1
Scientific & Academic Publishing (SAP)	1	University Utara Malaysian Institutional Repository	1
IJISSET	1	Macro think	1
Conferences			
IEEE	15	AISEL	7
Springer	1	ACM	1
EMCIS2008	1	Computing ICF	1

Table 9. Findings for classifications based on publishers

3.7 Classifications Based on Research Methods

According to the well-established methods extracted during our investigations, we represent the numbers of research methods in order to classify one hundred and one papers.

Figure 7 demonstrates the results of classifying the one hundred and one papers in order to the research methods. Regardless the others in this figure, the contribution of the ethnographic method is the least used in the total number of papers. In the beginning, the case study section accounts for 34 papers from the total, and the second largest research method was surveyed

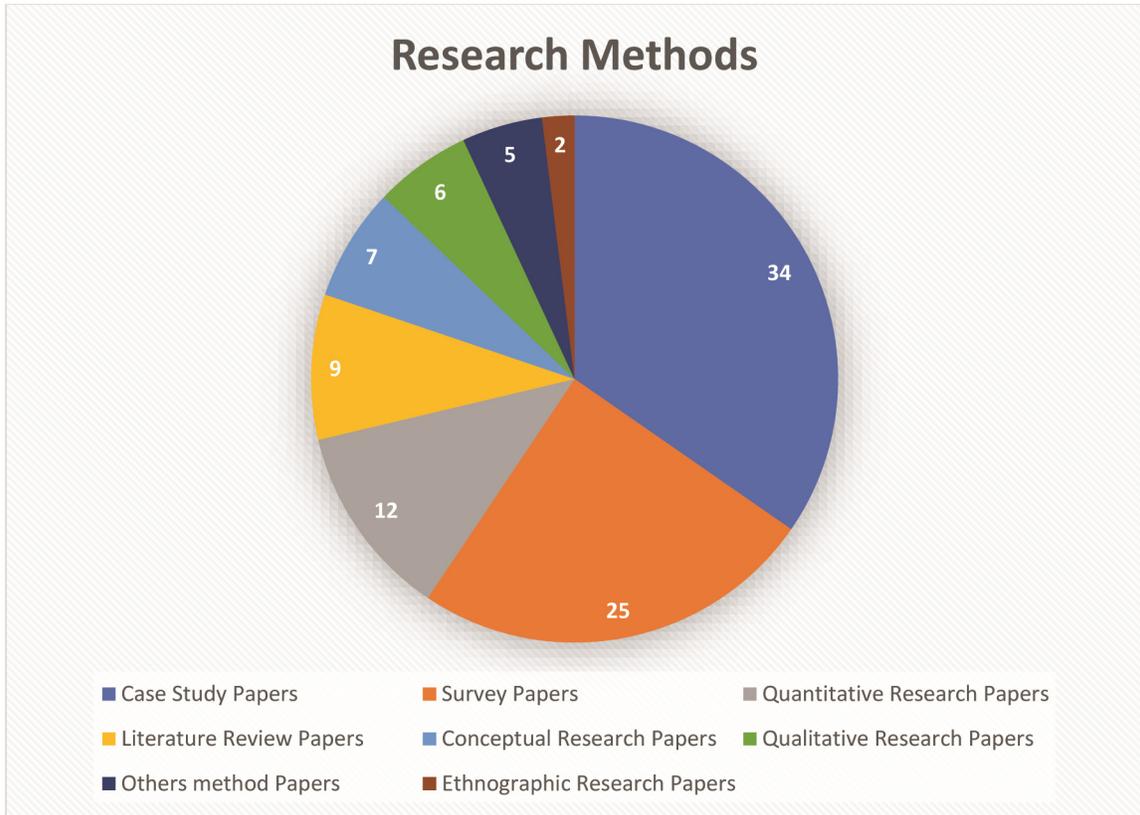


Figure 7. Research methods classifications

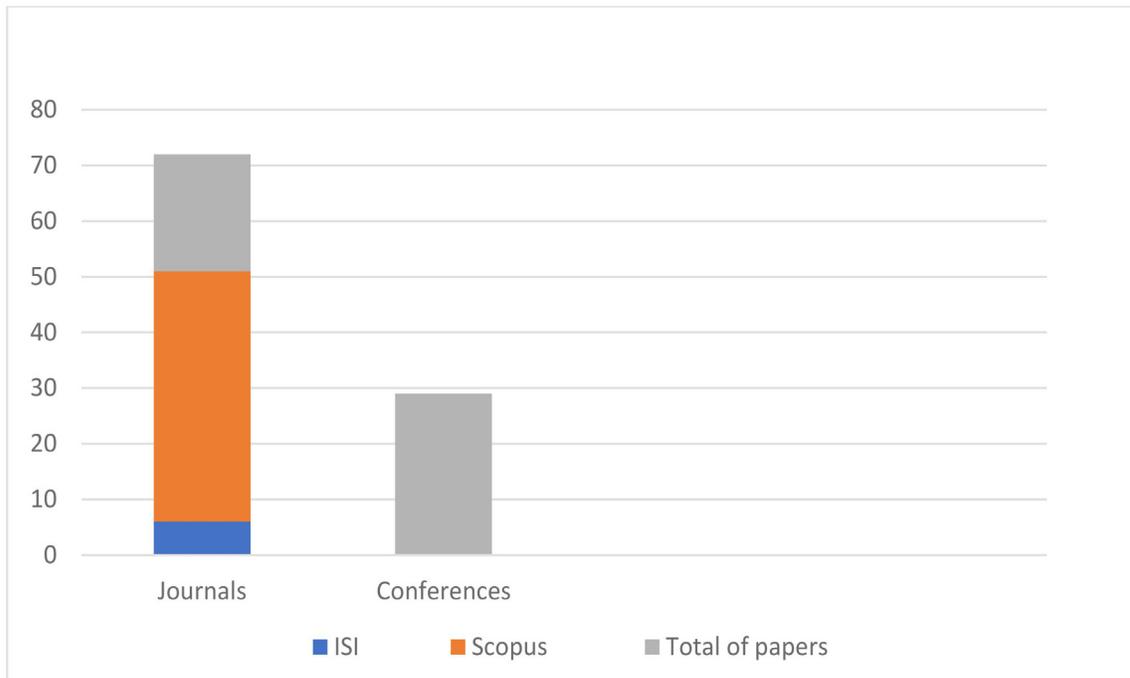


Figure 7. Classifications by articles type

accounts for 25 papers. Precisely, the quantitative research accounts for 12 papers. A small fraction of papers was in literature reviews and qualitative research.

3.8 Classifications Based on Articles Type

The section illustrates insights according to the ranks of paper publications. The results from one hundred and one papers for journals were 72 papers, and the conferences were 29 papers. We present two tables in this section. The first classified the journal papers in order to the Journal outlets and publications; this table has the largest number of overall papers. Moreover, in terms of journals, there were 45 papers in Scopus and 6 papers in the ISI ranking of journals. The second table in this section contributes to the findings of classifications by conference outlets and publications that showed the remnant of the total papers after extractions the papers to get 29 papers conferences. Figure 8 demonstrates the results of article types.

4. Conclusion

This paper provided a comprehensive literature review through a structure of the systemic snapshot approach of small packaged software vendors in SMEs. It also contributes the informative and beneficial results to the researchers through new categorizations of small packaged software vendors' especially in the life cycle in SMEs classifications. Though our research strategy to find out the most important papers were published from 2007 until 2017 based on small software vendors, ERPs, and SMEs. it creates a database from one hundred and one papers. This research used the specific life-cycle in its classifications, and other classifications help the readers to investigate the most important information in every type of classification. Furthermore, the most significant values of this paper are suggesting and identifying new research trends resulting from our procedures and classifications to the previous articles' research to the future disciplines.

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