

Chapter 2

IT Alignment in Public Organizations: A Systematic Literature Review

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Abstract IT alignment is one of the widely researched topics in the information systems research area and continue to be a top management concern. However, IT alignment in the context of public organizations is still less explored. A systematic literature review is conducted to provide an overview of the current status of the research in this area and the possible future research directions. Major databases and top conference proceedings in information systems and e-government area were searched by using key words to collect articles for analysis. Finally, a total of 58 articles were identified and included in the literature review. The findings of this study indicate case study research as the most preferred research method. But due to the small numbers of public organizations explored in these studies the results are problematic for generalisation. Apart from these findings we have identified and discussed the research concepts addressed in IT alignment in public organizations studies that were categorized using the dimensions of Strategic Alignment Maturity model. The findings of this study have revealed some potential future research directions that have been less explored like organizational culture, organizational politics, social interaction, and informal organizational structure influence on IT alignment in public organizations.

2.1 Introduction

Information Technology (IT) alignment is a topic which has attracted the attention of scholars and practitioners and has been researched extensively for the last decades. Review of academic literature reveals that IT alignment has been described

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and defined differently by different authors. Such terms as ‘*fit*’ (Henderson and Venkatraman 1993), ‘*harmony*’ (Luftman 2000), and ‘*linkage*’ (Henderson and Venkatraman 1993) are used to refer IT alignment. Chan and Reich (2007) argue that the variations in the terms as well as the conceptualization of the phenomenon are attributed to the differences in academic disciplines. For instance, the term ‘*fit*’ is used in strategic management discipline while ‘*alignment*’ is almost exclusively used in Information Systems literature. However, most of the definition of IT alignment tend to refer towards commercial organizational settings. According to Luftman et al. (2015, p. 2) alignment activities are defined as “*IT-business, and business-IT related managerial behaviours that can enable and promote the coordination and ‘harmonization’ of activities across the business and the IT domain in ways that add business value*”. However, McKeen and Smith (2003) conceptualise IT alignment broadly as a situation where organizational goals as well as the information systems that support them are in congruence. In public organizational settings, Winkler (2013, p. 834) define IT alignment as “*the degree to which the IT goals support the strategic goals of a public agency, and to which administration and IT stakeholders are committed to support these goals*”.

In opinion of Leonard and Seddon (2012) information systems managers consider IT alignment to be a key issue for their organizations. In fact, according to Kappelman et al. (2016) IT alignment continues to be the first top management concern for executives in organizations around the world. However, despite the frequent and wide investigations in the area with different viewpoints suggesting different future research directions, there are still areas that have not been addressed. For instance, previous studies have provided different definitions and characteristics, and identified various factors that could influence IT alignment (Luftman et al. 2004; Sposito et al. 2016). Several models have also been proposed to help in addressing the challenge of achieving IT alignment in organizations (Tapia 2009; Avison et al. 2004) like the strategic alignment model proposed by Henderson and Venkatraman (1993) that remains to be one the most widely known and used among IS researchers (Renaud et al. 2016). More than two decades on and after various models and frameworks built based on strategic alignment model, achieving IT alignment remains to be a challenging endeavour for organizations’ management.

On the other hand, IT alignment in specific types of organizations such as public organizations have not attracted the attention of researchers as they deserve (Winkler 2013; Vander Elst and De Rynck 2014) and there is a lack of research of IT alignment in public administration (Walser et al. 2016). In order to uncover the less explored areas and provoke further discussion on the topic, a systematic literature review of the previous studies is necessary (Webster and Watson 2002). According to Webster and Watson (2002) literature review contributes to the advancement of knowledge in an area of study by helping the development of theories and less studied areas are revealed while extensively explored topics are synthesised and analysed. This literature review is intended to contribute to research

in IT alignment in public organizations area in three ways. The first aim is to provide an overview of the IT alignment research activities in the domain of public sector organizations. The second aim is to structure studies in such a way that those interested can easily draw a link and compare the contributions of past studies. This will also make it easier for other researchers to easily identify studies that are relevant to their research area of interest. The third aim is to provide a systematic presentation of research literature review that helps to point out issues that have been explored while uncovering areas that have attracted less attention from researchers. The intention here is to show the research gap and indicate opportunities for future research in this area.

There are several reasons to attract researchers' attention on IT alignment in public organizations. A comparison of surveys conducted with managers from public and private institutions revealed "many similarities between the two sectors but also some pronounced critical differences" (Caudle et al. 1991, p. 172). The underlying factors for these differences were pointed out by different scholars (Muhammad 2009a, b; Meijer and Thaens 2010; Winkler 2013; Vander Elst and De Rynck 2014). The presence of stakeholders with competing or opposing interests, the wide variety of services delivered, and complex institutional structure with both political and administrative management powers are found to present a challenge for IT alignment in public organizations. Chan and Reich (2007) further argue that the differences between the private and public sectors make the need, use and application of IT different which in turn justifies the need for IT alignment studies in variety of organizational settings. Furthermore, information technology has become an important resource to improve the variety and quality of services provided by public organizations (Heintze and Bretschneider 2000; Garicano and Heaton 2010; Winkler 2013) which makes IT alignment studies relevant and timely appropriate.

The remainder of the paper is structured as follows. The detailed research method appears in the following section. The third and fourth sections present the results and the findings of the existing research on IT alignment in public organizations and in the last section are the conclusions that provide a summary of the main findings and suggestions for further research.

2.2 Research Method

This study was done through a systematic literature review that is a rigorous review of research results (Kitchenham et al. 2009; Okoli and Schabram 2010). The research questions and research process including the procedures in the search of the research literature and the method of analysis of the collected articles are presented in the following sub-sections.

2.2.1 Research Questions

In order to make sure the number of articles collected would be relevant and manageable for analysis, limiting the focus of the review was deemed necessary. For this purpose, a number of research questions were formulated. The research questions are:

RQ1: What research has been conducted on IT alignment in public organizations? Which publication channels (journals and conference proceedings) were used?

RQ2: What are the research goals and the research concepts studied in the area of IT alignment in public organizations?

RQ3: What research design was used in the research studies concerning IT alignment in public organizations?

RQ4: What are the main findings of research in IT alignment in the public organizations?

RQ5: What conclusions can be drawn from the findings of previous studies and what are the potential future research directions?

2.2.2 The Research Literature Review Process

IT alignment is one of the most researched topics within the information systems research area in the past three decades (Gerow et al. 2014; Vander Elst and De Rynck 2014; Coltman et al. 2015) and there are several sources of scientific literature. The literature search process was carried by following the guidelines as suggested by Webster and Watson (2002), Kitchenham et al. (2009), and Okoli and Schabram (2010). A total of six scientific databases were chosen to search for publications. These widely used databases were selected based on the variety of collection of scientific papers with breadth of research topics they index. According to Weber and Watson (2002), leading journals are sources of articles that could contribute significantly to the area of study. Thus, direct phrase search was conducted in the eight IS Senior Scholars' Basket of Journals, and the four reputable information systems conference proceedings. Apart from these top IS journals and conference proceedings, Government Information Quarterly journal and International Conference on Electronic Government proceedings were also included in the search of the research literature in IT alignment in public organizations due to their strong relevance to the topic of the review. The table of contents of these journals and conference proceedings were also manually scanned to find articles that were not caught by the search of combinations of keywords. In order to complete the literature selection, the citations of the articles found in the direct search were reviewed manually. Forward search was also carried out using Google Scholar to determine if the articles that cite the previously identified articles are

Table 2.1 Databases, journals and conference proceedings used in the research literature review

Databases	ACM Digital library AIS eLibrary EBSCO Host Emerald IEEEExplore ISI web of knowledge SpringerLink
Journals	European Journal of Information Systems Government Information Quarterly Information Systems Journal Information Systems Research Journal of Association of Information Systems Journal of Information Technology Journal of Management Information Systems Journal of Strategic Information Systems MIS Quarterly
Conference proceedings	AMCIS—Americas Conference on Information Systems ECIS—European Conference on Information Systems eGov—International Conference on Electronic Government HICCS—Hawaii International Conference on System Sciences ICIS—International Conference on Information Systems PACIS—Pacific Asia Conference on Information Systems

Table 2.2 Combinations of keywords used in the research literature review

“IT alignment” “strategic IT alignment” “alignment” “strategic alignment” “strategic IS alignment” “IS alignment” “business-IT alignment” “business/IT alignment” “IT-business alignment” “IT/business alignment” “strategic fit”	and	“public organization” “public sector organization” “public sector”
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relevant for the literature review. The databases, journals and conference proceedings used in the literature review are shown in Table 2.1.

Since the conceptualization and definitions have been various in academic literature, different terms have also been coined to refer IT alignment (Chan and Reich 2007). This would make it difficult to capture all of the relevant articles by searching only the title, abstract and keywords. The different combinations of key words used during the literature search are presented in Table 2.2.

Many case studies in IT alignment have been carried out and published in different trade publications (Chan and Reich 2007) as well as academic journals/conference proceedings (Coltman et al. 2015; Gerow et al. 2014). However, only peer reviewed articles investigating IT alignment in public

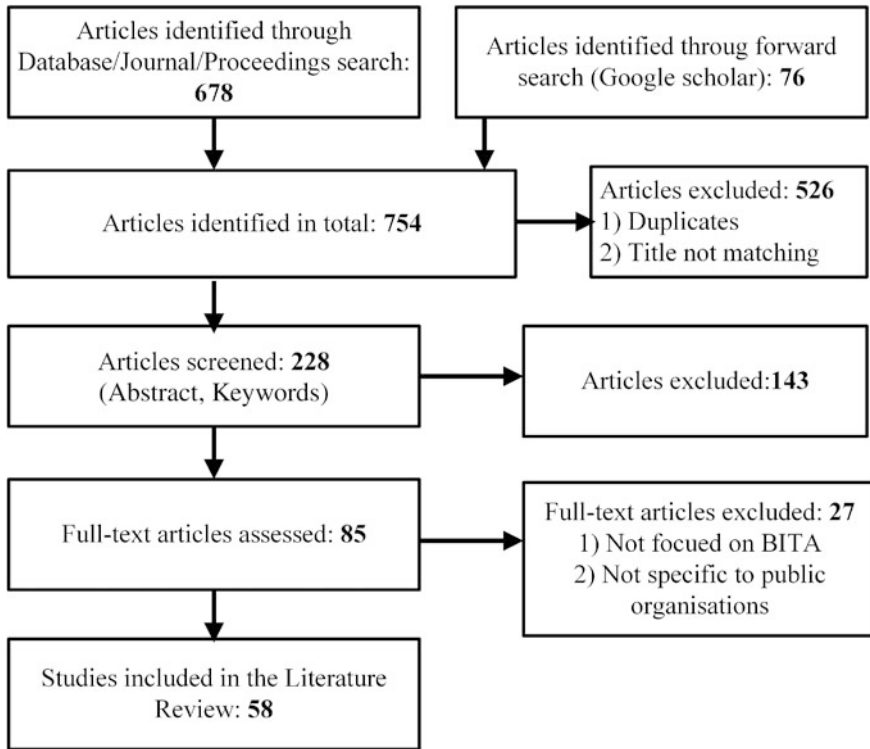


Fig. 2.1 The research literature review process

organizational settings were target for this literature review. Both conceptual and empirical studies published in English are included in the literature review process. Since little attention has been given to IT alignment research in the context of public organizations (Meijer and Thaens 2010; Muhammad 2009a, b; Winkler 2013), the year of publication is not restricted during the literature search in order to capture reasonable number of articles for analysis. Sub-topics of research were specified in order to gather all studies related to IT alignment. However, articles presenting research in progress as well as studies investigating both private and public organizations at the same time are excluded. The literature review process is shown in Fig. 2.1.

After capturing articles in journals and conference proceedings by searching both databases as well as the search functions of the selected journals and conference proceedings, a forward search was also carried out using Google Scholar. After the duplicates were removed, the evaluation of relevance of the studies to IT alignment in public organizations was done using the inclusion and exclusion criteria as is shown in Table 2.3. In the literature review process first, only the titles, the abstracts and key words of the articles were evaluated to make sure the inclusion criteria are met. If the studies were found to be within the scope of the research

Table 2.3 Inclusion/exclusion criteria in the literature review

Inclusion criteria	Exclusion criteria
Complete articles investigating IT alignment issues in public organizations	Research-in-progress articles
	Articles not published in peer-reviewed journals or conference proceedings
	Articles published as book chapters
	Articles on IT alignment not specific to public organizations
	Duplicate articles
	Articles written in languages other than English

topic, then these were selected for the second-round evaluation. In the second stage of the evaluation we have gone through the full text of the articles in order to find the articles which might contain inconsistencies between the abstract and its full content. The same inclusion/exclusion criterion as shown in Table 2.3 was used to arrive at the final list of articles chosen for the review.

The data collection in this literature review was manually extracted from each of the articles that were selected after the inclusion and exclusion criteria. The data collected from the selected articles is including the followings: Publication Type (journal or conference proceeding); Authors; Research Method; Main Research Concepts; Research Questions/Hypotheses/Objective; Findings and Conclusions.

2.3 Results

This section presents the results and discussions on the answers to the research questions.

2.3.1 *What Research has been Conducted on IT Alignment in Public Organizations? Which Publication Channels were used like Journals and Conference Proceedings?*

The literature search resulted in the identification of 58 relevant studies on IT alignment in public organizations which contains 33 journal articles and 25 conference articles that are presented in Table 2.4 and Table 2.5. A presentation of these papers selected for the review that were published between the years 1993 and 2016 is also shown in Fig. 2.2. As we noticed from Fig. 2.2 the first article investigating IT alignment in public organizational setting was published in 1993. The same journal (Journal of Strategic Information Systems) has published two more articles one in 1994 and another a year later. However, articles did not start to

Table 2.4 Research on IT alignment in public organizations published in journals

Journals	Articles
Business Process Management Journal	Ebrahim and Irani (2005); Koh et al. (2006)
Government Information Quarterly	Andrade and Joia (2012); Fedorowicz et al. (2009); Gil-García and Pardo (2005); Kim et al. (2007); Larsson and Grönlund (2014); Luna-Reyes et al. (2007); Meijer and Thaens (2010); Mergel (2016); Sawyer et al. (2008)
Health Care Management Review	Iveroth et al. (2013)
Information Polity: The International Journal of Government and Democracy in the Information Age	Vander Elst and De Rynck (2014)
Information Systems Frontiers	Klievink et al. (2016); Tonelli et al. (2015)
Information Systems Journal	Bannister (2001); Irani et al. (2005); Rose et al. (2015)
Information Technology and People	Wiredu (2012)
Journal of Information Technology	De Marco and Sorrentino (2007); Pang et al. (2014); Thorogood et al. (2004)
Journal of Information Technology Teaching Cases	Mu and Stern (2015)
Journal of Management Information Systems	Dulipovici and Robey (2013)
Journal of Strategic Information Systems	Broadbent et al. (1994); Flynn and Goleniewska (1993); Hasan and Lampitsi (1995); Lee-Partridge et al. (2000); Teo and Ranganthan (2003)
MIS Quarterly	Silva and Hirschheim (2007)
Records Management Journal	Asprey (2004)
Scandinavian Journal of Information Systems	Simonsen (1999)
TELKOMNIKA	Amali et al. (2014)

be published every year until 2003 except the year 2011. As it is shown in Fig. 2.2, the number of journal articles picked in 2014 (6 articles).

We also noticed that most of the journal articles were published in the Government Information Quarterly between 2005 and 2016 (9 articles) while the Journal of Strategic Information System is the second most publisher (5 articles) of IT alignment studies in public organizations followed by Information System Journal and Journal of Information Technology with 3 articles each (see Table 2.4).

The highest numbers of conference papers were published in the proceedings of the Hawaii International Conference on System Sciences (6 articles) and International Conference on Electronic Government (5 articles) as it can be seen from Table 2.5. Furthermore 3 articles were published in proceedings of Americas Conference on Information Systems and in proceedings of European Conference on e-Government (2 articles). All of the remaining conferences have published one article each.

The first two conference articles were published four years apart; the first in 1997 by Americas Conference on Information Systems followed by the second article

Table 2.5 Research on IT alignment in public organizations published in conference proceedings

Conference proceedings	Articles
Americas Conference on Information Systems	Papp (1997); Vargas et al. (2010); Walser et al. (2016)
Electronic Government International Conference	Christiansson et al. (2015); Iribar-ren et al. (2008); Isomäki and Liimatainen (2008); Mkude and Wimmer (2015); Van Veenstra and Zuurmond (2009)
European Conference on e-Government	Muhammad (2009); Ojo et al. (2009)
European Conference on Information Systems	Wastell et al. (2001)
Hawaii International Conference on System Sciences	Birkmeier et al. (2013); Chongthammakun and Jackson (2010); De Souza Bermejo and Tonelli (2011); Denford and Schobel (2012); Dulipovici and Robey (2012); Vogt and Hales (2010)
International Conference on Digital Government Research	Estevez et al. (2011)
International Conference on Electrical Engineering and Informatics	Seman and Salim (2013)
International Conference on Financial Theory and Engineering	Maidin and Arshad (2010)
International Conference on Model and Data Engineering	Doumi et al. (2011)
International Enterprise Distributed Object Computing Conference Workshops	Valtonen et al. (2011)
International Technology Management Conference	Tapia (2009)
Pacific Asia Conference on Information Systems	Hsu et al. (2006)
International Conference on Wirtschaftsinformatik	Winkler (2013)

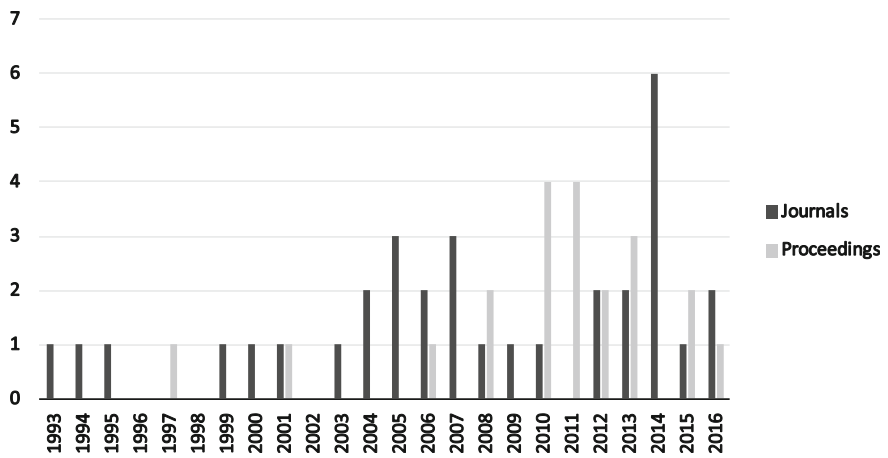


Fig. 2.2 Number of published articles by year

appearing in European Conference on Information Systems in 2001. It took another five years for the next article to be published in a conference proceeding. However, as shown in Table 2.5, conference articles were published every year since then except the years 2007, 2009, and 2014 by reaching a pick in 2010 and 2011 (four studies on each year). As we could see the number of articles published in conference proceedings are higher than the journal articles in the years 2008, 2010, 2011, 2013 and 2015.

2.3.2 What are the Research Goals Addressing IT Alignment in Public Organizational Settings?

Responding to the concerns of practitioners, where it has been identified as one of the top concern for many executives, researchers have extensively studied IT alignment. IT alignment has been described in many ways and scholars attempted to address the different issues that could influence it. However, the relationship between IT alignment and organizational performance was rarely questioned (Chan and Reich 2007). On the other hand, according to Luftman (2000) the main concern for both practitioners and researchers gravitate toward the three frequently asked questions: How can IT alignment be assessed?; (2) How can IT alignment be improved?; (3) How can IT alignment maturity be achieved?

The analysis of the current literature review also indicates that the conceptual as well as the empirical studies have attempted to answer one or combinations of these three questions by focusing on different factors that are related to IT alignment in the context of public organizations. The previous literature reviews indicate, the state-of-the-art of measuring IT alignment was considered to be one of the priorities of researchers leading to plethora of empirical studies (Gerow et al. 2014; Coltman et al. 2015). A presentation of the reviewed articles categorized on research goals is presented in Table 2.6.

As indicated in Table 2.6, the research goals of the articles reviewed indicate that the exploratory studies have been the primary choice of IT alignment researchers. A number of 37 articles were set out to further our understanding of IT alignment in public organizational setting. Moreover, we noticed that 11 studies have the objective of proposing different approaches and best practices to address different issues of IT alignment faced by public organizations. While the development, assessment and suggestion of models and frameworks was the research goal of 9 studies and the remaining 3 studies have proposed different assessment tools. A discussion of the articles reviewed in each research goal and also of the research topics is included below.

Table 2.6 Articles on IT alignment in public organizations categorized according to research goals

Research goals	Articles
Assessment tools	Klievink et al. (2016); Vander Elst, S., and De Rynck, F. (2014); Vogt and Hales (2010)
Best practices/approaches	Bannister (2001); Birkmeier et al. (2013); Broadbent et al. (1994); De Souza Bermejo and Tonelli (2011); Estevez et al. (2011); Sawyer et al. (2008); Simonsen (1999); Tapia (2009); Teo and Ranganathan (2003); Tonelli et al. (2015); Wastell et al. (2001)
Exploratory/understanding	Andrade and Joia (2012); Asprey (2004); Papp (1997); Chongthammakun and Jackson (2010); Christiansson et al. (2015); De Marco and Sorrentino (2007); Denford and Schobel (2012); Doumi et al. (2011); Dulipovici and Robey (2013); Fedorowicz et al. (2009); Flynn and Goleniewska (1993); Gil-García and Pardo (2005); Hasan and Lampitsi (1995); Hsu et al. (2006); Isomäki and Liimatainen (2008); Iveroth et al. (2013); Kim et al. (2007); Koh et al. (2006); Larsson and Grönlund (2014); Lee-Partridge et al. (2000); Luna-Reyes et al. (2007); Maidin and Arshad (2010); Meijer and Thaens (2010); Mergel (2016); Mkude and Wimmer (2015); Mu and Stern (2015); Muhammad (2009); Pang et al. (2014); Rose et al. (2015); Seman and Salim (2013); Silva and Hirschheim (2007); Thorogood et al. (2004); Tonelli et al. (2015); Van Veenstra and Zuurmond (2009); Vargas et al. (2010); Walser et al. (2016); Winkler (2013); Wiredu (2012)
Frameworks/models	Amali et al. (2014); Doumi et al. (2011); Ebrahim and Irani (2005); Irani et al. (2005); Iribarren et al. (2008); Ojo et al. (2009); Valtonen et al. (2011); Vander Elst and De Rynck (2014)

2.3.2.1 Assessment Tools

The literature review has identified three studies presenting different assessment tools that could be used to help organizations make judgements on different variables that are relevant for IT alignment. For instance, one of the studies (Vander Elst and De Rynck 2014) has explored how the political and institutional variables come into play with the alignment process in public organizations. The proposed assessment tools are designed to assess IT alignment in different levels. How organizations could use big data to significantly monitor their activities so that IT alignment is maintained is proposed by the second study (Klievink et al. 2016). In order to make sure public organizations maintain the objective of delivering valuable services and ‘public goods’ to their citizens, IT alignment needs to be maintained only when it has strategic significance (Vogt and Hales 2010). Community value estimation is meant to make sure public organizations focus on valuable endeavours for their communities (Vogt and Hales 2010).

2.3.2.2 Best Practices/Approaches/Methods

Several methods and approaches related to IT alignment were identified (11 studies). Contrary to the rational top-down approach, Simonsen (1999) presented a strategic alignment approach which is inspired by Scandinavian approach to system design. This approach is consistent with one of the exploratory studies (Fedorowicz et al. 2009). A different approach of IT alignment by integrating the ‘unintegrated’ information systems in public organizations is also proposed (Bannister 2001). The different methodologies in the studies were all meant to help organizations in their attempt to: identify and configure activities (Birkmeier et al. 2013; Sawyer et al. 2008; Teo and Ranganathan 2003) integrate systems (Bannister 2001), configure organizational structure and IT infrastructure (Broadbent et al. 1994; Wastell et al. 2001), assess readiness (Estevez et al. 2011), plan and implement IT governance (De Souza Bermejo and Tonelli 2011; Teo and Ranganathan 2003; Tonelli et al. 2015) in order to achieve and maintain IT alignment.

2.3.2.3 Exploratory Studies

A closer look into the exploratory studies shows the diversity of research topics. Even though previous findings of literature reviews indicate that the relationship between IT alignment and performance of organizations is rarely challenged, there were few studies which were set out to explore how IT alignment can influence the performance of public organizations. However, performance was studied from different angles. The questions raised address: how the different dimensions of IT alignment rather than IT alignment as a whole can influence organizational performance (Seman and Salim 2013); how antecedents of IT alignment can affect organizational performance; whether IT alignment improves user or employee satisfaction (Walser et al. 2016); whether lack of IT alignment could influence the success of e-government initiatives (Gil-García and Pardo 2005); and if achieving and maintain IT alignment is considered as a success of managing IT and if it contributes in gaining competitive advantage (Lee-Partridge et al. 2000).

Researchers have shown interest in investigating the different factors that could influence IT alignment in public organizations. The common factors studied include: organizational structure (Andrade and Joia 2012; Dulipovici and Robey 2013; Irani et al. 2005; Mergel 2016; Sawyer et al. 2008; Thorogood et al. 2004) and organizational culture (Dulipovici and Robey 2013; Irani et al. 2005). In addition to trying to identify organizational structures that would be conducive towards reaching IT alignment (Broadbent et al. 1994), studies have also attempted to investigate if such organizations that are considered as impediment can hinder organizations from achieving IT alignment (Andrade and Joia 2012).

The relationship between different IT governance practices and IT alignment has also caught the attention of researchers (Hasan and Lampitsi 1995; Maidin and Arshad 2010; Mu and Stern 2015; Tonelli et al. 2015). For instance, several studies have investigated whether IT alignment or strategic alignment planning should be

planned, initiated and led by the IT department (Flynn and Goleniewska 1993). On the other hand, the role of IT executives and business leaders to achieve IT alignment has been raised by researchers. How the relationship between IT leaders and other top management team (Denford and Schobel 2012; Luna-Reyes et al. 2007) and how the IT use of executives helps to achieve strategic alignment (Hasan and Lampitsi 1995) were also studied. Furthermore, the values and beliefs of leaders of public organizations and how this affects the way they support, lead and clarify vision that would create shared objective across the aisle which in turn brings about IT alignment was also one of the topics of a study (Rose et al. 2015).

Beyond the internal organizational variables, external environments were also addressed. The different changes in technology and political landscape or even events such as elections and how these could affect IT alignment are also some of the topics of research (Silva and Hirschheim 2007). Studies have also raised the issue of outside providers as well as collaborators and how their needs and objectives affect the existing internal routines and strategic alignment in public organizations (Fedorowicz et al. 2009; Mergel 2016). Authors have also carried out studies with the aim of proposing best practices and approaches that could help in achieving IT alignment in public organizations. The suggested methods, however, differ among studies. For instance, the introduction of the position of Government Chief Information Officer (GCIO) in order to demonstrate the attention given to IT in public organizations is considered to contribute toward the alignment process. The development of assessment model on how organizations can gauge their readiness to embrace this function is among the research goals (Estevez et al. 2011). A programme was also proposed to help in improving the link between IT leaders and administrative executives (Dulipovici and Robey 2013).

Unlike many private organizations, the public organizations do not carry out robust strategic IT planning (Vargas et al. 2010). How public organizations plan to achieve IT alignment in a different way than public organizations (Papp 1997) and the importance of readiness to engage in robust planning and efficient communication (Vargas et al. 2010) are two of the studied topics. Public organizations' IT strategic readiness (Koh et al. 2006); the robustness and effectiveness of enterprise architecture types in achieving IT alignment (Isomäki and Liimatainen 2008; Valtonen et al. 2011; Van Veenstra and Zuurmond 2009); relative importance of components of Unified Strategic Alignment (Vargas et al. 2010) and theory formulation in order to influence IT alignment dimensions (Iveroth et al. 2013; Seman and Salim 2013) are other issues addressed. There were also studies that were set out to challenge the current prominent body of research. For instance, the fact that IT alignment remains to be difficult to achieve in the public healthcare domain (Koh et al. 2006) was pointed out as a sign that new approaches have to be brought into light to further our understanding to the phenomenon. One study (Meijer and Thaens 2010) raises the question on whether different configuration types of public organizations are necessary to reach alignment that is suited to match the specific operational strategies of organizations. Other studies further raised and attempted to investigate if other disciplines could help us to understand IT alignment better. For instance, can disciplines such as public administration together with strategic IT

management possess the tools to shade light and lead us to achieving alignment by clarifying public bureaucracy and public value (De Marco and Sorrentino 2007); Pang et al. 2014; Wiredu 2012).

2.3.2.4 Frameworks/Models

Eight of the studies reviewed have attempted to either develop new models or frameworks (Amali et al. 2014; Doumi et al. 2011; Ebrahim and Irani 2005; Irani et al. 2005; Iribarren et al. 2008; Valtonen et al. 2011) or evaluated the already existing frameworks and models to propose new process models (Ojo et al. 2009) that could be applied in public organizations. On the other hand, researchers have also proposed new approaches on how IT alignment is assessed using the existing models (Vander Elst and De Rynck 2014). The evaluation of the Strategic Alignment Maturity (SAM) model of Luftman (2000) and how different approaches could be followed in order to make the model suited to be applied in public organizations is the goal of two studies (Ojo et al. 2009; Vander Elst and De Rynck 2014). Furthermore, enterprise architecture and how it could be used to enhance alignment is also a topic for researchers (Doumi et al. 2011; Ebrahim and Irani 2005; Valtonen et al. 2011). The aim of the studies focusing on frameworks and models could be grouped into two categories: evaluation of different variables influencing IT alignment (Irani et al. 2005; Iribarren et al. 2008), and different dimensions of IT alignment or IT alignment at different levels (Doumi et al. 2011; Vander Elst and De Rynck 2014) and proposing models and frameworks to design, organise, implement and manage resources in such a way that IT alignment is achieved (Amali et al. 2014; Doumi et al. 2011; Ojo et al. 2009; Valtonen et al. 2011).

2.3.3 What Are the Research Concepts Addressing IT Alignment in Public Organizational Settings?

As pointed above, there are several constructs and models proposed to help us further our understanding and help organizations assess, improve, reach and maintain IT alignment (see Coltman et al. 2015 for a list of IT alignment models). For the purpose of this review, Luftman et al. (2015) Strategic Alignment Maturity (SAM) model with its six dimensions (Communication, Value Analytics, IT Governance, Partnering, Dynamic IT Scope, and IT and Business Skills Development) that promotes alignment was used as a IT alignment model to group the research concepts covered in the articles reviewed (Table 2.7).

The SAM model of Luftman et al. (2015) was chosen as it was validated by a survey across 16 different industries thus making it not specific to a particular industry, business function or company. Furthermore, SAM model is considered to

Table 2.7 Research concepts found in the selected articles categorized according on the six dimensions of SAM model of Luftman et al. (2015)

SAM dimensions	Research concepts	Communication			Value Analytics			IT Governance				Managing risk
		Knowledge management	Organizational learning	Shared domain knowledge	Assessment	Perception of value of IT	Public value	Value of IT	Best practices	IS/e-Gov. implementation	Levels of alignment	
Articles												
Ebrahim and Irani (2005)												
Koh et al. (2006)	✓								✓			
Gil-Garcia and Pardo (2005)				✓						✓		
Luna-Reyes et al. (2007)				✓								
Kim et al. (2007)	✓								✓	✓		
Sawyer et al. (2008)												
Fedorowicz et al. (2009)												
Meijer and Thiens (2010)												
Andrade and Joia (2012)												
Larsson and Grönlund (2014)												
Mergel (2016)												
Iveroth et al. (2013)					✓	✓		✓				
Vander Elst and De Rynck (2014)		✓									✓	
Tonelli et al. (2015)								✓				
Klievink et al. (2016)					✓				✓			
Bannister (2001)	✓		✓				✓					
Irani et al. (2005)					✓							
Rose et al. (2015)	✓			✓			✓	✓				
Wiredu (2012)												
Thorogood et al. (2004)							✓	✓				

(continued)

Table 2.7 (continued)

SAM dimensions Research concepts	Communication		Value Analytics			IT Governance			Managing risk	
	Knowledge management	Organizational learning	Shared domain knowledge	Assessment	Perception of value of IT	Public value	Value of IT	Best practices		IS/e-Gov. implementation
De Marco and Sorrentino (2007)										
Pang et al. (2014)						✓				
Mu and Stern (2015)		✓						✓		
Dulipovici and Robey (2013)	✓									
Flynn and Goleniewska (1993)					✓					
Broadbent et al. (1994)					✓					
Hasan and Lampitsi (1995)					✓					
Lee-Partridge et al. (2000)							✓			
Teo and Ranganathan (2003)										
Silva and Hirschheim (2007)										
Asprey (2004)										
Simonsen (1999)										
Amali et al. (2014)										✓
Papp (1997)										
Vargas et al. (2010)								✓		
Walser et al. (2016)								✓		
Isomäki and Liimatainen (2008)										
Iribarren et al. (2008)				✓						
Van Veenstra and Zuurmond (2009)		✓					✓			

(continued)

Table 2.7 (continued)

SAM dimensions	Communication			Value Analytics			IT Governance				
	Knowledge management	Organizational learning	Shared domain knowledge	Assessment	Perception of value of IT	Public value	Value of IT	Best practices	IS/e-Gov. implementation	Levels of alignment	Managing risk
Research concepts									✓		
Mkade and Wimmer (2015)											
Christiansson et al. (2015)											
Muhammad (2009)			✓								
Ojo et al. (2009)											
Wastell et al. (2001)		✓									
Vogt and Hales (2010)						✓	✓				
Chongthammakun and Jackson (2010)											
De Souza Bermejo and Tonelli (2011)						✓			✓		
Denford and Schobel (2012)											
Dulipovici and Robey (2012)		✓	✓								
Birkmeier et al. (2013)											
Estevez et al. (2011)				✓							
Seman and Salim (2013)				✓						✓	
Maidin and Arshad (2010)									✓		
Doumi (2011)				✓					✓	✓	
Valtonen et al. (2011)											
Tapia (2009)		✓						✓			
Hsu et al. (2006)				✓							
Winkler (2013)							✓				✓

be the most utilised IT alignment model both in research literature and among practitioners (Renaud et al. 2016).

Communication has been pointed out to be one of the most important enablers of IT alignment in public organizations (Koh et al. 2006; Tapia 2009). The research topics, in the identified articles, however were mainly presented in the form of knowledge management (Asprey 2004; Dulipovici and Robey 2013), organizational learning, or knowledge not shared and kept in a ‘silo’ (Bannister 2001). Different frameworks, models and processes proposed to help in achieving IT alignment have also reiterated the significance of communication (Bannister 2001; De Souza Bermejo and Tonelli 2011; Irani et al. 2005; Sawyer et al. 2008). There are 9 studies that have explored the issue of communication in relation to IT alignment.

IT governance which refers to how organizations allocate the decision-making authority in relation to IT (Luftman et al. 2015) and how it is related to IT alignment has attracted the attention of many of the studies reviewed. Studies have investigated on whether there are efficient IT governance frameworks that might lead to IT alignment or attempted to design new IT governance structures (e.g., Amali et al. 2014; Estevez et al. 2011; Hasan and Lampitsi 1995; Maidin and Arshad 2010; Tonelli et al. 2015; Winkler 2013). A total of 22 studies have IT governance as their main topic of research.

The second most studied dimension of IT alignment is **partnering** which refers to relationship between the two sides of organisation—business and IT (Luftman et al. 2015). The relationship between IT executives and the rest of top management team is widely studied (e.g., Broadbent et al. 1994; Denford and Schobel 2012; Hasan and Lampitsi 1995; Luna-Reyes et al. 2007; Mu and Stern 2015; Simonsen 1999) along with how a collaborative approach involving the business and IT staff in planning of shared strategies (e.g., Broadbent et al. 1994; Isomäki and Liimatainen 2008; Muhammad 2009a, b; Simonsen 1999). A total of 20 studies have addressed the issues related to the two IT alignment dimensions.

Both **value analytics** which describes how metrics can be used to measure the contribution of IT in a language that would be understood by the business- and IT organisation, and **dynamic IT** scope referring to the adaptability or flexibility in terms of emerging technologies and provision of tailored solutions (Luftman et al. 2015), have gained attention in the IT alignment research. Since the measurement IT alignment might be challenging due to the intangible nature of services provided by public organizations (Vogt and Hales 2010), new ways of assessing different levels of alignment were proposed (Klievink et al. 2016; Vander Elst and De Rynck 2014; Vogt and Hales 2010). On the other hand, how organizational change should be planned and implemented so that it could be aligned with the changes in technology (e.g., De Marco and Sorrentino 2007; Koh et al. 2006; Van Veenstra and Zuurmond 2009; Walser et al. 2016) and other external environments (De Marco and Sorrentino 2007; Koh et al. 2006; Larsson and Grönlund 2014; Mergel 2016; Vander Elst and De Rynck 2014) were explored as well. While the number of studies addressing the dimension of value analytics was 14, the number of dynamic IT scope stands at 17.

The literature review also reveals that human resource practices which are referred as '*business and IT skills development*' (Luftman et al. 2015) have not caught the attention of the IT alignment researchers so far (7 studies were identified). Even though IT governance studies have touched upon human resource related practices (e.g., Tonelli et al. 2015; De Souza Bermejo and Tonelli 2011), only five studies have focused on addressing the issues (Asprey 2004; Dulipovici and Robey 2013; Silva and Hirschheim 2007; Teo and Ranganathan 2003; Walser et al. 2016). Few studies have also researched organizational readiness for change (Ojo et al. 2009; Estevez et al. 2011).

2.3.4 What Research Design has been used in the Research Studies Concerning IT Alignment in Public Organizations?

In a literature review process, authors might choose to restrict the studies based on specific research design or methodology (Okoli 2015). However, the author also cautions against setting narrow including criteria based on particular research design which might limit the number of articles that could satisfactorily provide an overview of the research in the field being investigated. No restriction was placed on the research design used while searching for articles for this review.

The research design followed by the authors of the articles reviewed are broadly categorized into conceptual and empirical (Table 2.8). The analysis follows the scheme as suggested by Orlikowski and Baroundi (1991) for categorising information systems research literature. The articles under the category of conceptual are those ones which have used literature reviews and previous theoretical frameworks to draw theories, models and frameworks. Hence, the articles categorized under empirical are those ones who have used case study, survey, and mixed methods as is shown in Table 2.8.

From the research studies, we have reviewed and presented in Table 2.8, only 4 are conceptual studies. As indicated in Table 2.8, the analysis of the studies has shown that empirical studies are by far the dominant group of IT alignment studies in the context of public organizations. On the other hand, case studies are the most widely applied research method with 40 of the 54 studies conducted using the research method. This is consistent with most studies in the field of information systems (Oates, 2005). On the other hand, studies on IT alignment investigating public organizations which are known to have complex organizational structure, various stakeholders with competing or even opposing interests (Winkler 2013) call for using case study research method. According to Yin (2014), case studies are appropriate for studying complex concepts involving multiple actors, processes and goals in depth while maintaining the overall characteristics of real-life events. Concerning the other research methods used and shown in Table 2.8 we noticed

Table 2.8 Articles in IT alignment in public organizations categorized according to research design

Research design		Journals	Proceedings	Total	Articles
Conceptual		4	0	4	Ebrahim and Irani (2005); Gil-García and Pardo (2005); Larsson and Grönlund (2014); Pang et al. (2014)
Empirical	Case study	25	15	40	Asprey (2004); Bannister (2001); Chongthammakun and Jackson (2010); Christiansson et al. (2015); De Marco and Sorrentino (2007); De Souza Bermejo and Tonelli (2011); Denford and Schobel (2012); Doumi (2011); Dulipovici and Robey (2012); Dulipovici and Robey (2013); Fedorowicz et al. (2009); Hasan and Lampitsi (1995); Irani et al. (2005); Iribarren et al. (2008); Isomäki and Liimatainen (2008); Iveroth et al. (2013); Kim et al. (2007); Klievink et al. (2016); Koh et al. (2006); Lee-Partridge et al. (2000); Luna-Reyes et al. (2007); Meijer and Thaens (2010); Mu and Stern (2015); Muhammad (2009); Ojo et al. (2009); Rose et al. (2015); Sawyer et al. (2008); Silva and Hirschheim (2007); Simonsen (1999); Tapia (2009); Teo and Ranganthan (2003); Thorogood et al. (2004); Van Veenstra and Zuurmond (2009); Vander Elst and De Rynck (2014); Vogt and Hales (2010); (Walser et al. 2016); Wastell et al. (2001); Wiredu (2012)
	Survey	3	5	8	Broadbent et al. (1994); Flynn and Goleniewska (1993); Hsu et al. (2006); Maidin and Arshad (2010); Papp (1997); Tonelli et al. (2015); Vargas et al. (2010); Winkler (2013)
	Mixed methods	1	5	6	Birkmeier et al. (2013); Estevez et al. (2011); Mergel (2016); Mkude and Wimmer (2015); Seman and Salim (2013); Valtonen et al. (2011)

survey to be the second in the category of empirical research design while a number of six articles have used mixed methods.

2.4 Findings

The summary of the main findings of the reviewed studies on IT alignment in public organizations is presented below.

2.4.1 A Holistic View that Should Focus on Relationship Between Organizational Structure, IT Infrastructure as Well as Overall Organizational Objective is Needed in Order to Achieve IT Alignment in Public Organizations

The complexity of organizational structure in public organizations coupled with the public bureaucracy makes it a daunting task for leaders in their attempt to reach strategic alignment. On the other hand, studies have shown that achieving IT alignment will not be problematic if simultaneous adjustments are made to the IT infrastructure, organizational structure as well as business objectives (Thorogood et al. 2004; Wiredu 2012).

2.4.2 Public Administration Studies Need to Inform Researchers and Practitioners on how IT Alignment Should be Approached to Enable Public Value

Findings suggest that sustaining IT alignment for long period of time is more challenging than achieving it in the first place and should be viewed as a continuous process (Vander Elst and De Rynck 2014). However, other disciplines such as public administration studies can inform both IT and business leaders to gain realistic grasp of the relationship between technological as well as organizational changes in public organizations (De Marco and Sorrentino 2007). IT alignment will have little value for organizations and the citizen unless it enables to advance public value (Vogt and Hales 2010) by utilising the available resources and overcoming competing objectives from different stakeholders (Pang et al. 2014).

2.4.3 IT Alignment in Public Organizations is Found to be Correlated with Organizational Performance

The empirical studies investigating organizational performance in different forms have shown that IT alignment is correlated with a positive organizational performance. For instance, among the factors affecting the success of e-Government initiatives, misalignment between business and IT was placed before the competing or opposing goals from different stakeholders (Gil-García and Pardo 2005). IT alignment is also considered to be one of the top four IT management success factors in public organizations (Lee-Partridge et al. 2000). On the other hand,

empirical studies have also indicated that IT alignment is associated with employee and IT users' satisfaction (Walser et al. 2016) as well as positive IT governance practices. IT alignment is also found to contribute to the establishment of strategic directions in public organizations (Kim et al. 2007).

2.4.4 Organizational Structure Plays an Important Role on Influencing IT Alignment in Public Organizations

Previous literature reviews have shown that organizational structure plays an important role on influencing IT alignment. The findings of the studies reviewed also indicate that this is also the case in public organizational settings. The topic is among the widely-discussed factors that could influence IT alignment in public organizations (Andrade and Joia 2012; De Souza Bermejo and Tonelli 2011; Irani et al. 2005; Mu and Stern 2015; Muhammad 2009a, b; Tapia 2009; Thorogood et al. 2004; Wiredu 2012). However, studies have also shown that the external environment have an influence on how public organizations are structured. For instance, abrupt change in external events such as elections followed by organizational restructuring may lead to misalignment as it poses a risk of failure in the introduction of planned information system (Silva and Hirschheim 2007).

2.4.5 Public Organizations have Different Choices of Paths Toward IT Alignment

One of the characteristics that make public organizations from others is the large size of stakeholders as well as variety of services they provide to their citizens (Winkler 2013). This requires different public organizations to follow different strategies that may lead to different outcomes. However, studies also indicate that even those organizations which have similar tasks may possess different resources, different organizational structure, as well as different alignment strategy choices (Hsu et al. 2006; Sawyer et al. 2008). On the other hand, organizations may also have different approaches in the way they go about reaching IT alignment. For instance, unlike the common top-down approach where strategic alignment is formulated at the top and cascaded down to the tactical and operational level, IT alignment may be planned using a participatory approach (Simonsen 1999). Such approaches are found to be effective in the public organizational setting (Fedorowicz et al. 2009; Luna-Reyes et al. 2007).

2.4.6 Organizational Culture and Social Interactions Play an Important Role in Shared Understanding of IT Alignment

Findings of studies indicate that lack of shared understanding for IT alignment is associated with organizational culture coupled with obsolescence and IT personnel operating in silos (Mu and Stern 2015). Even though communication between various discipline experts, social interactions is found to be conducive for knowledge sharing and IT alignment, interaction outside the formal organizational structure might lead to different social representations (Asprey 2004; Dulipovici and Robey 2013) which eventually can lead to misalignment (Dulipovici and Robey 2013).

2.4.7 Relationships Between Executive Leaders, Involvement of Executive Leaders and IT Use by Executive Leaders is Influencing IT Alignment

The role of leaders in influencing IT alignment in public organizations is demonstrated through empirical studies. For instance, the perception of the strategic role of the CIO by the CFO and vice versa affects the relationship the two executives will have. This relationship in turn determines the outcomes of their respective roles in reaching IT alignment (Denford and Schobel 2012). On the other hand, studies show that the involvement of executive leaders facilitates the success of IT alignment in different levels (Asprey 2004). The executive use of IT is also found to contribute on improving the communication between the business and IT departments which in turn helps in IT alignment.

2.5 Conclusions

The conclusions that can be drawn from the findings of the reviewed studies and the potential future research directions are presented below.

This study has presented a systematic literature review on IT alignment in public organizations. The aim of this study was to identify the main findings of the studies related to IT alignment in public organizations in the last 23 years. For this purpose, we have used in our literature review a large number of information systems databases, journals and conference proceedings as well as e-Government journals and conference proceedings to identify the most relevant studies. Following a systematic research review the literature search process was rigorous and has due to identification of the articles that are relevant to provide an overview of the

state-of-the-art. The analysis of the findings of the reviewed studies indicates that IT alignment in the public organizations remains to be one of the challenging phenomena for leaders in these organizations. The studies also had shown the growing awareness of leaders on the issue. *The common theme among the studies include the complex organizational structure, the challenges of measuring the value of IT, the IT governance mechanisms, IT infrastructure, public bureaucracy, and enterprise architecture and how these all affects IT alignment in public organizations.* Different enablers and inhibitors of IT alignment and how public organizations could tackle them were also addressed by both empirical and conceptual studies. *Some of these factors such as organizational structure, different enterprise architecture types, IT governance frameworks are studied widely* which has resulted in suggestions of appropriate choices. However, *other factors such as organizational culture, organizational politics, social interaction, and informal organizational structure influence on IT alignment in public organizations have been less studied.* Many studies have acknowledged the effects of the configuration of organizational structures, IT infrastructures and business objectives with the goal of strategic alignment. However, external factors which might have influence on IT alignment have not attracted the attention of many researchers. For instance, public organizations are the users of external information systems of different service providers and collaborators. But as we noticed only a few studies have explored how the objectives, priorities or values of these external providers interfere with the strategic alignment endeavour of public organizations. The effects of political events and unexpected external environment changes on IT alignment could also be studied further.

The role of executive leaders' in IT alignment has garnered also researchers' attention. Different themes stand out in the research studies surrounding IT and business leaders. The relationship between IT leaders and the rest of top management team as well as the values and beliefs of IT leaders in affecting IT alignment might be further investigated to reveal deeper insights. A possible further research direction might be how the relationship between political leaders, IT leaders and public organisation's employees is influencing IT alignment. For example, the organizational politics influence on IT alignment could be a relevant topic to be studied in a further research. Concerning the most preferred choice of research method we have found that in most of the studies reviewed this is case study research which is consistent with other studies in the information systems discipline. This has presented some implications on the findings of most of the studies. The models, frameworks and best practices proposed are constructed based on only on one or a few cases which could be problematic in terms of generalisation of the results. Apart from the studies attempting to validate the Strategic Alignment Maturity model in some public organizational settings and the proposed modification of the model, we have found studies that were aimed at solving specific problems for a few public organizations. The study of different IT alignment approaches challenging the traditional top-down strategy planning such as participative approach (if this will be replicated and validated) might bring a new insight concerning IT alignment in public organizations.

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