

# Organizational Readiness in the Operations Management and Information Systems Disciplines: Concept Review and a Crisp Set Comparative Analysis

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This paper presents the results of a conceptual review of the organizational readiness concept in the Operations Management and Information Systems (OMIS) discipline. The results reveal three main conceptualization themes in the reviewed literature: 1) resource availability (i.e., the availability of organizational resources and assets), 2) operational flexibility and maturity (i.e., the level of maturity and flexibility of organizational processes and operations), and 3) collective willingness and propensity (i.e., the collective willingness and propensity of organizational members to change). The results also suggest that these themes consist of multiple aspects as well as overarching dimensions of organizational readiness construct in the OMIS research. In addition, a crisp set comparative analysis was conducted and revealed mixed results about the relationship of organizational readiness and its referent dependent variables. These results reaffirm that organizational readiness is a multi-dimensional construct and provide guidelines about the necessity and sufficiency of the identified dimensions in different domains.

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## I. INTRODUCTION

In today's dynamic world, organizations must change constantly in order to survive and sustain their competitiveness (Armenakis and Harris, 2009; Grover et al., 1995). While the nature of these changes could range from adopting a new quality management program (e.g., TQM, ISO, Six Sigma) to implementing a new enterprise information system (e.g., SCM, ERP, EDI), what is common among all is that implementing change is difficult and requires

preemptive preparation. This is referred to as *organizational readiness for change* or simply as *organizational readiness* in the literature (Armenakis et al., 1993; Weiner et al., 2008).

The concept of organizational readiness for change was first proposed in the change management discipline (Coch and French, 1948; Lewin, 1947; Lewin and Cartwright, 1951). Since then, the concept has been applied and adapted to different contexts, including operations research (Haday and Pellerin, 2010), information systems management (Iacovou et

al., 1995), and healthcare management (Weiner et al., 2008).

In the Operations Management and Information Systems (OMIS) discipline, organizational readiness is recognized as a precursor to successful implementation (Gargeya and Brady, 2005; Iacovou et al., 1995; Kettinger and Grover, 1995). For many years, OMIS researchers studied the implications of organizational readiness in multiple domains, including adoption and implementation of Total Quality Management (TQM) (McNabb and Sepic, 1995), Six Sigma (Hensley and Dobie, 2005; Lagrosen et al., 2011), Business Process Reengineering (BPR) (Grover and Kettinger, 1995, 1997), Supply Chain Management (SCM) systems and ERP implementation (Iacovou et al., 1995; Chewlos et al., 2001), e-commerce and online systems (Mehrthens et al., 2001; Molla and Lickers, 2005) and big data and analytics (Raguseoa et al., 2018). Nonetheless, despite the numerous implications and growing interest of researchers, little research has traditionally concentrated on the conceptualization of this concept (Armenakis et al., 1993; Shahrabi and Paré, 2014; Weiner et al., 2008). As a result, several calls have been made in the literature to clarify the concept and identify its multiple facets or dimensions (Martin et al., 2008; Rusly et al., 2012; Shahrabi and Paré, 2014). For example, Martin et al. (2008) suggest that “while the importance of organizational readiness for successful innovation adoption and implementation has been highlighted repeatedly, there is [yet] no consensus about which dimensions constitute organizational readiness” (p. 3). Rusly et al. (2012) indicate “although there is considerable research on readiness, there is little consistency in defining and conceptualizing the term. This is largely due to its abstract nature, which has resulted in various definitions ... unfortunately, previous literature tends to discuss only a fraction of readiness aspects and fails to provide

a comprehensive representation of the construct” (p. 331).

In light of the above and with the aim to contribute to the collective understanding of this important concept, this study conducts a comprehensive review of the literature and proposes a refined conceptualization of the organizational readiness construct. This proposed conceptualization offers a multi-dimensional perspective of organizational readiness that consists of three overarching dimensions, including: 1) *resource availability* (i.e., the availability of organizational resources and assets), 2) *operational flexibility and maturity* (i.e., the level of maturity and flexibility of organizational processes and operations), and 3) *collective willingness and propensity* (i.e., the organizational members’ collective propensity and willingness to change). The paper also presents the results of a crisp set comparative analysis of the reviewed empirical studies, which highlights the importance of developing a multi-dimensional conceptualization of this construct in our field. The next section discusses the methodology of the study and the guidelines used to search the literature. The results and findings are discussed consecutively. Finally, the implications for research and practice are presented.

## II. METHOD

### 2.1. Data Collection

The review began with a keyword search of the main business databases, including *ABI/INFORM Complete*, *EBSCO*, *ISI Web of Knowledge*, and *Science Direct* (Webster and Watson, 2002). A broad list of keywords was selected based on the recommendations of previous studies (Armenakis et al., 1993; Weiner et al., 2008). The preliminary list of keywords grew as the search process proceeded. No time restriction was applied to the search. However, the search was limited to scholarly

and peer-reviewed journals and conferences in the fields of operations management and information systems. Non-scholarly articles, research notes, news articles, study protocols, commentaries, white papers and editorials were excluded. The database search was complemented with a backward search and a heuristic manual search on Google Scholar and AIS Electronic Library (AISEL). This was meant to ensure maximum coverage of the relevant studies and minimize the possibility of omitting any impactful article. A total of 1047 articles were included in the primary sample. Irrelevant articles and those out of the focal domain of the study were removed from the sample through a rigorous multi-phase screening process. First, a title and abstract review was conducted to determine each article's relevance to the topic and the main research phenomenon. This followed by a full-text review in which all the remaining articles were read in full and separately coded by two coders. To ensure the reliability of the coding, a coding scheme was designed and pretested by three coders including the researchers. The coders separately coded 10 randomly selected articles and an average of 85% inter-rater agreement was reached among the coders. Minor issues and disagreements were discussed in separate meetings and a final joint meeting with all three coders. At the end of the meetings, minor changes and rewordings were made to the final coding scheme. At the end of the process, 122 articles remained for the analyses.

## **2.2. Data Analysis**

Two separate thematic analyses were conducted to synthesize the reviewed literature and identify the main themes of research and conceptualizations of organizational readiness. A thematic analysis is a widely known and well-structured data analysis technique to synthesize and categorize the content of literature

(Boyatzis, 1998; see also Roberts et al., 2012; Leidner and Kayworth, 2006).

In addition, three separate Crisp Set Comparative Analysis (CSQCA) analyses were conducted to investigate the consistency of the empirical findings among the reviewed studies. CSQCA is a structured and robust analytical technique that uses Boolean algebra to investigate the causal relationship between causal conditions and outcomes/dependent variables (Ragin, 1999; Rihoux and De Meur, 2009). The method was designed by Ragin (1987) to examine the relationship between multiple causal conditions and an outcome and to identify the necessity and sufficiency of the conditions for the occurrence of the outcome. The method has been widely adopted in different research domains, especially in the social sciences. The original work by Ragin (1987) has been cited over 8000 times in the past two decades.

CSQCA is based on the assumption of "multiple conjectural causation," which means that a given outcome may result from a combination of causal conditions that are either necessary, sufficient, or both (Berg-Schlusser et al., 2009; Ragin, 2008). Under this assumption, an outcome is often caused by a combination of different causal conditions rather than a single one (Ragin, 2008).

In this study, CSQCA was used to examine previous empirical findings on the relationship between organizational readiness and its referent/dependent variables. Since the focus of the method is on sets rather than on quantitative correlations, it provides the opportunity to compare the results of both qualitative and quantitative studies (Berg-Schlusser et al., 2009; Ragin, 1999). The results offer interesting insights on the necessity or sufficiency of the organizational readiness dimensions within different research domains. Fuzzy Sets Comparative Analysis (fsCA) software was used to examine the occurrence of

different scenarios and the relationship between the conditions and the outcomes (Ragin, 2008).

### III. RESEARCH FINDINGS

#### 3.1. Research Findings: Profile of the Articles

The first observation of the results indicates a chronological growth in the number of publications on organizational readiness over the past two decades. In particular, the number of publications in the past 5 years almost doubled in comparison to the number of articles published in the previous years. This initial observation not only reaffirms the importance of this construct in the fields of operations management and information systems, but also suggests the growing interest in this important topic of researchers in these fields. As Table 1 shows, the articles are published in a wide range of journals.

The results also indicate that most of the reviewed articles are empirical and used quantitative methods (see Table 2). Most of these studies (over 93%) used questionnaire survey as their main method of data collection. The organizational readiness construct was applied in different contexts, including TQM projects, Six Sigma implementation, business process reengineering, e-commerce, supply

chain management systems, ERP, EDI and other integrative systems.

Finally, the results are consistent with prior claims in the literature regarding the conceptualization issues related to this construct (see MacKay et al., 2004; Martin et al., 2008; Rusly et al., 2012). More specifically, the results suggest two main problems with regard to the conceptualization of organizational readiness in the reviewed literature. First, more than half of the reviewed articles did not provide a clear conceptual definition of organizational readiness. Second, many others lack sufficient detail regarding the operationalization and measurement of the construct in their studies. These issues highlight serious ambiguities in the definition of this construct and the underlying dimensions that form its conceptualization (MacKay et al., 2004; Martin et al., 2008; Rusly et al., 2012). Our review also identified a lack of cumulative tradition in the literature regarding the dimensions of organizational readiness. As discussed below, the variety of the proposed/adopted conceptualizations of organizational readiness in the reviewed literature, even across studies that investigate similar phenomena, have over time led to a disconcerted and somewhat fragmented literature.

**TABLE 1. DISTRIBUTION OF ARTICLES.**

<i>Journal/Conference Proceedings</i>	<i>No. of Publications</i>
<i>Business Process Management Journal</i>	9
<i>Information &amp; Management</i>	9
<i>Industrial Management &amp; Data Systems</i>	5
<i>MIS Quarterly Executive</i>	4
<i>European Journal of Operational Research</i>	4
<i>European Journal of Information Systems</i>	4
<i>International Journal of Production Economics</i>	4
<i>Americas Conference on Information Systems (AMCIS)</i>	4
<i>Hawaii International Conference on System Sciences</i>	4
<i>IEEE International Conference on Industrial Engineering and Engineering Management</i>	4
<i>International Conference on Information Systems(ICIS)</i>	4
<i>International Journal of Enterprise Information Systems</i>	3
<i>Communications of the Association for Information Systems</i>	3
<i>Journal of Global Information Technology Management</i>	3
<i>Decision Sciences</i>	2
<i>Decision Support Systems</i>	2
<i>Management Decision</i>	2
<i>MIS Quarterly</i>	2
<i>Information Systems Research</i>	2
<i>International Journal of Operations &amp; Production Management</i>	2
<i>International Journal of Production Research</i>	2
<i>Internet Research</i>	2
<i>Journal of Knowledge Management</i>	2
<i>Journal of Management Information Systems</i>	2
<i>Pacific Asia Conference on Information Systems</i>	2
<i>Information Systems Journal</i>	1
<i>Information Systems Management</i>	1
<i>Management Science</i>	1
<i>Supply Chain Management: An International Journal</i>	1
<i>Technovation</i>	1
<i>Benchmarking: An International Journal</i>	1
Other journals and conference proceedings	30
<b>Total</b>	<b>122</b>

**TABLE 2. PROFILE OF THE REVIEWED ARTICLES.**

Article Type	Empirical (102)		Conceptual (20)
Research Methods	Quantitative (77)	Qualitative (25)	
	Questionnaire survey (72), Case study (19), Qualitative survey (1), Secondary data (2), Field study (2), Interview and focus group (3), Content analysis (2), Not Specified (3)		
Study Context	SME (45), Large (14), Both (21), Not Specified (24)		
	TQM, ISO, Six Sigma, BPR, ERP, EDI, Ecommerce, etc.		

**3.2. Research Findings: Main Research Streams**

Early studies in the OMIS domain conceptualize organizational readiness as a predictor of the adoption and implementation of new systems or a quality program in the organization (e.g., Grover and Kettinger, 1995; Guha et al., 1997; Iacovou et al., 1995; McNabb and Sepic, 1995). For example, Grover and Kettinger (1995) discuss the importance of organizational readiness and change management activities in the context of BPR projects. McNabb and Sepic (1995) propose readiness as a critical step and a main success factor in TQM implementation and suggest that most if not all failures of TQM implementation projects have roots in the lack of readiness for the change within the organizations. Iacovou et al. (1995) investigate the importance of readiness in the context of adopting and implementing new information systems, arguing that the adoption and implementation of enterprise information systems such as EDI or ERP systems are contingent on having not only sufficient funds and financial resources to pay for the installation fees, licensing fees and other

incremental implementation costs, but also the right technological resources and infrastructure. Following their lead, several researchers in recent years have investigated the implications of organizational readiness in other contexts, including Six Sigma projects (Hensley and Dobie, 2005; Kumar et al., 2011), ERP implementation (Gargeya and Brady, 2005; Zhu et al., 2010), Internet banking and e-commerce adoption (Grandon and Pearsons, 2004; Hadaya and Pellerin, 2010) and big data and analytics (Raguseoa et al., 2018).

Investigating the relationship between organizational readiness and implementation success is another major theme of research on this topic. The studies in this domain hypothesize a positive link between organizational readiness and successful implementation and empirically examine the relationship between these two constructs (Gargeya and Brady, 2005; Martin et al., 2008; Zhu et al., 2010). For example, Gargeya and Brady (2005) examine the relationship between readiness and success in the specific context of ERP implementations. Conducting a content analysis on published cases of ERP implementation, they found that organizational

readiness is a major contributor to implementation success in almost all the cases they reviewed. Zhu et al. (2010) also found empirical evidence of a positive significant relationship between organizational readiness and ERP implementation success.

While the above research themes constitute the main body of organizational readiness literature in the OMIS discipline, recent studies have applied this construct to other research domains (Kien et al., 2010; Loebbecke et al., 2012; Ranganathan and Balaji, 2007; Rusly et al., 2012). For example, Ranganathan and Balaji (2007) discuss the importance of organizational readiness in the outsourcing domain. Studying both successful and unsuccessful cases of IT outsourcing and off-shoring, they suggest that a firm's internal ability and preparation to undertake outsourcing projects (called "IT outsourcing readiness") is one of the main contributors to the success of organizations in outsourcing. Loebbecke et al. (2012) examine organizational readiness in the specific context of cloud-based services. Based on a case study of a cloud transition in a multinational company in the automotive industry, they propose seven criteria to assess organizations' technological readiness for transferring to cloud-based platforms. Finally, Rusly et al. (2012) propose a conceptual model that highlights the implications of organizational readiness for the process and success of knowledge management implementation in organizations.

### 3.3. Research Findings: Main Conceptualization Themes

A closer look into the surveyed literature shows that in addition to being applied differently, the construct of organizational readiness has been also defined differently in the literature. More specifically, while early conceptualizations of organizational readiness only focused on the role of the resources

organizations needed to implement change (e.g., financial resources, technological resources, and infrastructure), recent studies propose other dimensions (e.g., capabilities, competencies, and psychological factors) in an effort to develop and enrich the conceptualization of this construct (Basole, 2007; Molla and Lickers, 2005; Shahrabi and Paré, 2014). As such, the result of our thematic analysis revealed three main domains or conceptualization themes within the reviewed literature: 1) resource availability, 2) operational flexibility and maturity, and 3) collective willingness and propensity.

1) *Resource availability*: The first theme includes articles that conceptualize readiness with regard to the availability of organizational resources and assets that are required to adopt and implement a new system or quality program/initiative (Chwelos et al., 2001; Iacovou et al., 1995; Rao, 2000). Some early conceptualizations of organizational readiness fall in this category, including those proposed by Iacovou et al. (1995) and Chwelos et al. (2001). This group of articles maintain that the availability of resources (e.g., financial resources, technological resources, human resources, etc.) is an essential factor that ensures the readiness of an organization for OMIS-based imminent change (e.g., TQM, BPR, Six Sigma, ERP, e-commerce). This group of articles, which make up the majority of the reviewed literature, are the strongest theme among the three identified themes.

2) *Operational flexibility and maturity*: While the availability of resources is a major dimension proposed in the previous conceptualizations reviewed in the literature, a second group of conceptualizations emphasize the flexibility and maturity of organizational processes as a major component of change. These articles argue that processes are at the core of all businesses and any major change in the organization poses dramatic changes to its structure and processes. Most often, the gap

between an organization's existing processes ("as is" processes) and those that are required and compatible with the new system ("to be" processes) forces it to endure a major structural redesign and process re-engineering effort prior to the actual change or project (Davenport, 1998; Loebbecke and Palmer, 2006). Therefore, organizations with more flexible structures and business processes can typically respond more rapidly and effectively to change. Similarly, organizations with documented, standardized, and formalized business processes are generally well prepared to adopt new innovations and to adapt their processes to the new changes and transformations (Basole, 2007; Raymond et al., 2006). Thus, operational maturity and flexibility as defined above are suggested as key indicators of organizational readiness in the context of OMIS changes and transformations (Basole, 2007; Martin et al., 2008).

*3) Collective willingness and propensity:*

While the majority of the literature (over 90% of the reviewed articles) falls into the above two categories, some recent studies highlight the importance of an organization's collective state of mind and psychological homogeneity for a successful change (Paré et al., 2011; Rusly et al., 2012). Drawing on behavioral and psychological theories of organizations, these

studies argue that a successful change requires resources and other necessary structural conditions in the organization (e.g., flexible infrastructure and processes, capabilities, and competences), but to succeed in its implementation and reap the expected benefits, an organization requires high morale and psychologically homogeneous employees who are collectively capable of mobilizing those resources and delivering the change successfully (Paré et al., 2011; Shahrabi and Paré, 2014, 2015). For example, Paré et al. (2011) propose the term "psychological readiness" and define it as a collective construct that reflects employees' cognitive and emotional inclination to accept, embrace, and adopt a particular plan to purposefully alter the status quo (p. 2). Rusly et al. (2012) also argue that the success of OMIS initiatives such as knowledge management programs depends on the extent to which the employees feel collectively competent and capable to deliver the change (p. 332). Shahrabi and Paré (2014) suggest that organizational readiness should encompass both structural and psychological attributes of organizations.

Table 3 presents sample items used to measure these dimensions.



**TABLE 3. SAMPLE ITEMS/QUESTIONS FOR MEASURING THE THREE DIMENSIONS.**

Dimension	Sample items/questions adapted from previous studies	Key References
Resource Availability	<ul style="list-style-type: none"> <li>▪ To what extent does the organization have the required financial resources to fund the project?</li> <li>▪ To what extent does the organization have the required technological resources and equipment?</li> <li>▪ To what extent does the organization have the necessary infrastructural capacity and required platforms?</li> <li>▪ To what extent does the organization have sufficient business resources to implement the new system/program?</li> </ul>	<p>Iacovou et al. (1995)  Molla and Licker (2005)  Mehrtens et al. (2001)  Chwelos et al. (2001)  Zhu et al. (2006)</p>
Operational Flexibility	<ul style="list-style-type: none"> <li>▪ To what extent are the organization’s processes and practices flexible and ready to change?</li> <li>▪ To what extent are the organization’s processes aligned and compatible with those required for the change?</li> <li>▪ To what extent are the organization’s processes documented, formalized, and optimized with regard to the upcoming change?</li> <li>▪ To what extent are the organization’s processes required to improve and be modified before the change?</li> </ul>	<p>Molla and Licker (2005a)  Basole (2007)  Martin et al. (2008)  Razmi et al (2008)  Zhu et al. (2010)  Raymond et al. (2006)</p>
Collective Propensity and Willingness	<ul style="list-style-type: none"> <li>▪ To what extent are the people in the organization accepting and aggressive about the change?</li> <li>▪ To what extent are the people in the organization willing to change the way they work?</li> <li>▪ To what extent is the leadership enthusiastic and willing to change the old system or practices?</li> <li>▪ To what extent is the attitude in the company positive toward the new program/system and the changes around it?</li> </ul>	<p>Paré et al. (2011)  Rusly et al. (2012)  Rusly et al. (2014)</p>

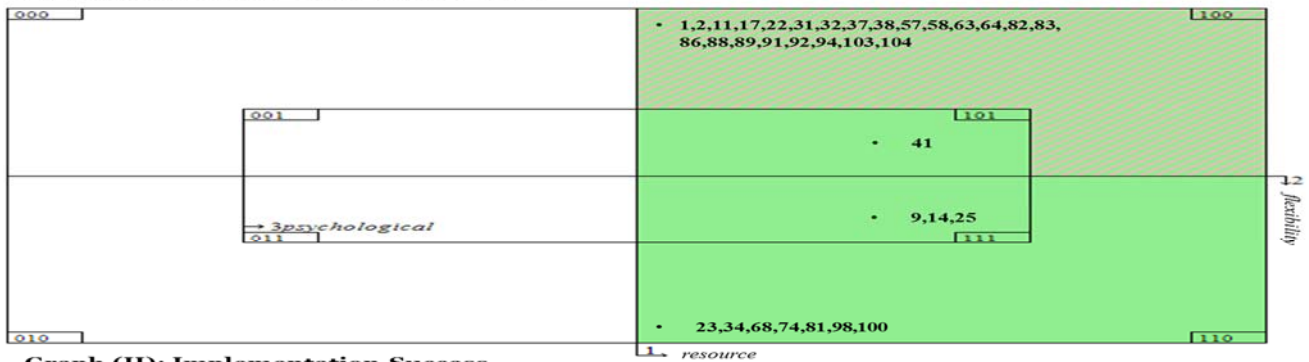
### 3.4. Crisp Set Comparative Analysis

Fig. 1 presents the results of the CSQCA analysis of the three main research domains that emerged from the literature review. More specifically, each graph illustrates the relationships between organizational readiness and the dependent variables or the main phenomenon of each study. Each graph is divided into eight zones that present the configuration (presence or absence) of each dimension of organizational readiness in the conceptualizations of the studies in that zone (i.e., condition). For instance, “zone 100”, located on the upper right side of the graph, contains the configuration in which only the resource availability dimension is present in the proposed conceptualization by the articles in this zone. In other words, the articles in this zone conceptualize organizational readiness with the resource availability dimension only. Similarly, “zone 110” (lower right of the graphs) features the articles that conceptualize organizational readiness as a multi-dimensional construct with the resource availability and operational flexibility dimensions. Finally, “zone 111” includes articles in which all organizational readiness dimensions are present (resource availability, operational flexibility, and collective willingness). The colors of the zones illustrate the consistency or inconsistency of the occurring outcomes (empirical results). Solid green means consistent results among the articles investigating the relationship of organizational readiness and the dependent variables in that zone, while the pattern means

mixed results within the empirical findings of the studies in this zone. White means there is not a sufficient number of empirical articles in those categories/zones.

As Fig. 1 illustrates, the CSQCA reveals mixed results about the relationships of organizational readiness and its focal dependent variables in one zone and consistent results in the others. The results are mixed only when the researchers conceptualize and operationalize organizational readiness as unidimensional. The results also suggest that resource availability is a necessary condition/dimension, but it is not a sufficient condition/dimension of this construct. In the CSQCA, a condition is *necessary* “if it must be present for an outcome to occur” and *sufficient* “if by itself it can produce a certain outcome” (Berg-Schlusser et al., 2009, p. 12). The analysis also suggests that in the first theme (adoption and implementation studies), the resource availability dimension is a necessary but not sufficient dimension, while the other two dimensions are sufficient but not necessary conditions. In other words, according to graph I, the resource availability dimension is present in all the studies that found an outcome (i.e., a significant relationship between organizational readiness and the dependent variables; see zones 100, 101, 110, 111 graph I). However, it is not a sufficient condition since in some cases it alone could not make the outcome occur (pattern zone). For the other two groups of studies (graphs II and III), all three conditions were found to be sufficient but not necessary to create the outcome (see graphs II and III).

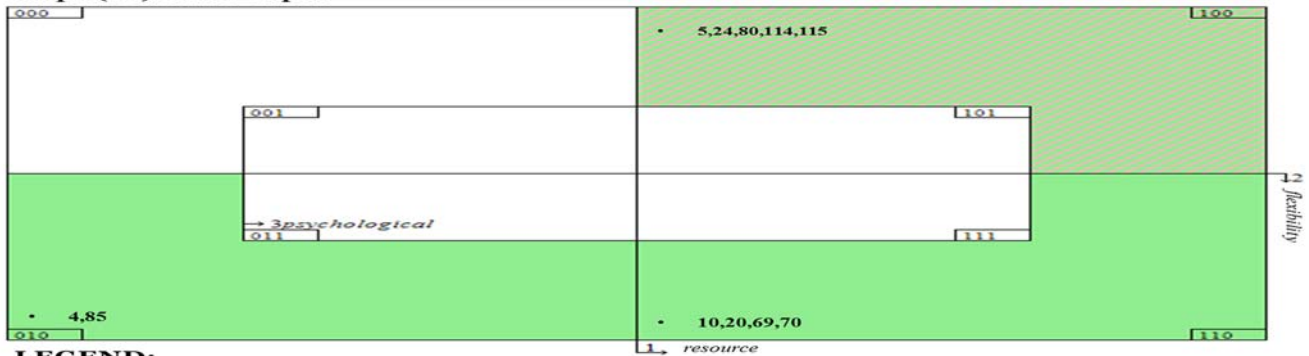
**Graph (I): Adoption and Implementation**



**Graph (II): Implementation Success**



**Graph (III): Other Topics**



**LEGEND:**

- I Consistent results
- C Mixed Results

**Zones Descriptions:**

- 000: ~resource, ~ flexibility, ~psychological
- 100: resource,
- 010: flexibility,
- 001: psychological
- 110: resource, flexibility,
- 101: resource, psychological
- 111: resource, flexibility, psychological

**FIGURE 1. RESULTS OF THE CRISP SET COMPARATIVE ANALYSIS.**

#### IV. CONCLUSION

Keen (1980) invited the research community to build a cumulative tradition around the core concepts and theories. Since then, several attempts have been made by leading scholars to clarify different concepts including user involvement (Barki and Hartwick, 1994), knowledge management (Alavi and Leidner, 2001), user resistance (Lapointe and Rivard, 2005), and absorptive capacity (Roberts et al., 2012). The present study followed a similar path and aimed to clarify the conceptualization of the construct of organizational readiness in the OMIS field. It makes two main contributions to the extant literature. First, it proposes a new conceptualization of organizational readiness by reviewing and synthesizing the extant literature. More specifically, by juxtaposing the overarching conceptualizations in the extant literature, the present paper offers a multi-dimensional conceptualization of organizational readiness that offers a more comprehensive yet parsimonious view of this construct. It is expected that this conceptualization will deepen the collective understanding of this multi-dimensional construct in our field and contribute to a cumulative tradition in this area (Keen, 1980). Second, the paper contributes to the conceptual clarity of the organizational readiness construct in the OMIS discipline, which is important for developing reliable and more accurate psychometric properties and measurement instruments (MacKenzie et al., 2011; Straub, 1989). Future researchers can draw on the proposed conceptualization and develop reliable and robust measures and psychometric properties for this important construct (Basole, 2007; Martin et al., 2008).

The results of the CSQCA suggest that failing to distinguish and address this multi-dimensional conceptualization can lead to

mixed results in the empirical studies investigating the relationship between organizational readiness and other important phenomena in the OMIS discipline (Holt et al., 2010; Weiner et al., 2008). The gap between research and practice in this domain has prevented the field of operations management from building a cumulative knowledge about organizational readiness and its implications for this discipline. This study is a first step to motivate dialogue between researchers and practitioners in this domain.

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