

Identification of Barriers In The Implementation of Agile Supply Chain In Healthcare

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Abstract- The purpose of this paper is to identify the barriers in Health Care Service industry. An exhaustive literature survey of peer-reviewed journal articles, survey reports, master thesis, doctoral thesis, interviews with doctors, nurses, supportive staff and relatives of patients information brochures are used as the research methodology.

The literature survey has led to identification of distinguished barriers in Healthcare supply chain under various categories. Out of which only top 10 barriers are considered for this article. The significance of the barriers identified varies based on geographical, political, social aspects. However these barriers are highlighted most by researchers and can be considered as Top barriers in Healthcare supply chain under respective categories.

Government of various countries around the world is motivating and assisting small and medium scale hospitals to understand and implement agile systems by preparing accessible database of agile consultants, guidelines for healthcare practitioners and providing financial assistance for training by professionals. This project work provides a launching pad to develop a strategy to handle barriers for successful agile implementation in healthcare service industry. This paper puts forward the key barriers that should be tackled for successful agile supply chain implementation in Healthcare. It will represent new openings for rigorous and relevant research that would contribute to more translucent knowledge of agile supply chain in healthcare being gained.

Keywords: Barriers, Agile Supply Chain Management (ASCM), Healthcare etc.

I. INTRODUCTION

The rising cost of quality healthcare is becoming an increasing concern. A recent visit to a local emergency room (ER) motivated the author of this work to literally investigate the crucial element of supply chain management (SCM) within the healthcare system. After experiencing approximately 3 hours of delays in the ER waiting room and witnessing incredible lags in the medication dispensing process and even further impediments to the delivery of treatment modalities, the researcher became outraged with the thought of a high-performing healthcare system's lack of better supply chain management and service delivery. As a healthcare consumer, one is prone to such environment. This scenario is likely to happen to any one of us.

One might contemplate how an industry based on customer service falls short in the arena of inventory and materials management? According to business researcher Vicki Smith-Daniels (2006) in a field where precision is literally a matter of life and death, it seems strange, that a crucial supportive function like inventory control and purchasing is often a hit-or-miss process. Healthcare, unlike other industries has not given supply chain management the detailed attention that it so rightly deserves and needs to ensure patient safety and reduce overall healthcare costs. (John Michael Woosley, May 2009)

Providing the right care, to the right patient, at the right time is not only the definition of providing quality healthcare, but also the key to the long-run viability of our healthcare system. However, healthcare delivery system in India is often unable to match the supply of healthcare services with the demand for that care. Intense, inherent demand variability renders this synchronization almost impossible to maintain for any significant period of time. (Tom Christopher Rust, May 2013).

The mismatch between patients and providers has been shown to lead to significant adverse effects: demand variability has been suggested as a main driver for increasing healthcare delivery costs (Litvak, 2005), unexpected surges in admission rates have been linked to increased likelihoods of unplanned patient readmission (Baker et al, 2009), and the inability to maintain a desired patient: provider ratio has been correlated to increased patient mortality (Needleman et al, 2011; Aiken, 2002). Demand variability may be the most pressing problem facing healthcare delivery today. (Tom Christopher Rust, May 2013).

Furthermore, present day healthcare delivery is defined by the idea that networks of clinicians, rather than individual clinicians, provide patient care, and that the success or failure of healthcare delivery is ultimately determined by the ability of those clinicians to coordinate their activities. As healthcare increases in complexity, these previously disparate care processes and clinicians become even harder to manage and align, resulting in further increased risk to patients and inefficient use of system resources. Analysis from supply chain management research indicates that linking locally controlled service delivery processes (i.e., individual healthcare clinics or hospital departments) into continuous chains of service provision creates internal demand variability that amplifies already problematic external variability. (Tom Christopher Rust, May 2013).

Healthcare delivery is facing a 'perfect storm' of demand variability, stemming from the combination of exogenous and endogenous demand variation. As our delivery systems become more interconnected and dependent upon each other, the problems currently caused by demand variation will undoubtedly be further magnified. Hence, being able to quickly adapt to ever-changing rates of patient arrivals and flow through healthcare systems is crucial to the overall success of healthcare delivery. Creating new management structures and decision heuristics to better respond to both internally and externally driven demand variation is essential to ensure that the supply of care can be synchronized to meet the peaks and troughs of patient demand.

Defining, evaluating, and implementing new healthcare service delivery management methods, at the operations level, is clearly of critical importance to providing effective, high-quality healthcare. (Tom Christopher Rust, May 2013).

First coined by researchers at the Iacocca Institute at Lehigh University in 1991, 'agile' focuses on increasing system responsiveness to demand through changing all parts of a product or service system, from organizational structures, to information systems, to logistics processes, to management decision heuristics. (Tom Christopher Rust, May 2013). Agile has recently been suggested as a means to improve healthcare service delivery (Vries & Huijsman, 2011), but specific practices or operational plans to increase 'agility' have not been developed for service chains, including healthcare.

This literature survey can be a platform for agile healthcare researchers to take appropriate action to overcome barriers for successful agile supply chain implementation. This paper is further organized as follows. The subsequent sections describe the research methodology, barriers in successful lean implementation which is followed by discussion, conclusions, limitations and future work.

II. RESEARCH OBJECTIVE AND METHODOLOGY:

2.1 Research objective:

The primary objective of this paper is to identify the barriers for successful implementation of in agile supply chain in healthcare service sector. The secondary objective is to prepare a launching pad for further research, specifically for agile supply chain implementation strategy development for healthcare and analyzing the interactions among agile supply chain barriers. In this research study, research factors are the barriers for successful implementation of the agile supply chain in healthcare supply chain system.

2.2 Research methodology

This work can be characterized as a theoretical concept, specifically for literature survey on barriers in Agile Supply Chain in healthcare service sector. The study is exploratory in nature, which constitutes a secondary source. Very less literature exists in the field of Agile Supply Chain in healthcare service sector.

Following criteria are used for inclusion of literature;

- Literature published on Agility, Supply chain, Healthcare service sector, Barriers, obstacles, factors of agile supply chain
- Literature published on barriers in agile supply chain and Healthcare service sector;
- Literature published from 1995 to 2018
- Journals relevant editorial scope;
- Survey reports published on by professional agencies;
- Web articles;
- Articles published in reputed referred scholarly journals, working papers, master theses and doctoral theses;
- Articles addressing issues related to the problems agile supply chain and Healthcare service sector;
- Articles presenting a agile supply chain model or framework, specifically in Healthcare service sector; and
- Keywords used in article:
 - *Primary keywords:* agile , ASCM (Agile Supply Chain Management), agile production, agile management, agility and HSC (Healthcare Supply Chain).
 - *Secondary key words:* Barriers, lack of, failure, obstacles, pitfalls, stumbling blocks, challenges, limitations, constraints and problems. Detail information of literature search is given in Table 1

Time period	Search engines	Primary key words	Secondary Key Words	
From 1997 to 2013	Google Scholar	Agile	Key words Group: 1	Key words Group: 2
	Springer Link	ASCM	Barriers	Challenges
	Emerald	Agile Production (AP)	Lack of	Limitations
	Elsevier Science Direct	Agile Management (AM)	Obstacles	Constraints
	Taylor & Francis	Agility	Pitfalls	Problems
	World Scientific	HSC (Healthcare Supply Chain)	Stumbling blocks	
	Bing			

Table 1:Details of Literature Search

The flowchart of the research methodology used in this study is shown in Figure 1. The literature review was augmented by the use of online computerized search engines such as Elsevier Science Direct, Emerald, Taylor & Francis, IEEE Xplorer, Google Scholar, Springer Link and Bing using keywords or terms that are often used in the literature to describe agile-related principles and practices and were therefore deemed to be the most relevant primary search keywords such as Agile, Agile

Management (AM), Agile Production (AP), Agile Healthcare management, Agile SCM, Agile thinking and Agile enterprise and secondary keywords like barriers, lack of, failure, obstacles, hinders, pitfalls, stumbling blocks, challenges, limitations, constraints and problems. Literature was taken from journals in the areas of journals in the domain of production planning and control, healthcare services, production research, production management, operations management, manufacturing technology, and operations management, SCM, logistics management, project management, leadership and organizational development and HRM.

In addition to this search, articles, master theses, doctoral theses as well as survey reports by professional agencies, such as Forrester Research, Aberdeen and Canadian Manufacturers and Exporters, are also included after scanning the reference sections of the initially selected papers. The ultimate list of articles reviewed for this paper emphasis more on articles published in reputed referred scholarly journals. Based on this review, articles that met the criteria of addressing issues related to the problems in lean implementation and presented a model or framework were selected. A survey of literature was carried out on the basis of the editorial scope and contents of the journals, and a list of journals was compiled. Journals stating in their editorial scope such as agile and ASCM were selected. A comprehensive review of the table of content of the journals, abstracts, and wherever necessary, a review of the complete paper was carried out. A literature survey primarily focuses on barriers in agile and agile supply chain in healthcare service sector.

III. IDENTIFICATION OF BARRIERS IN HEALTHCARE SERVICES OF AGILE SUPPLY CHAIN

Several studies have examined the barriers to adequate health care utilization that contribute to the health disparities between minorities and the majority population. The purpose of this exploratory paper is to identify the barriers that make it difficult for organisations to bring about improvements to internal and therefore external service, and explore the nature of internal services and how they can be assessed. The paper concludes with the implications for academics and practitioners and the limitations of this study with the barriers with high driving power and dependency need more attention. The proposed Agile Healthcare Supply Chain Model focuses on such barriers.

The aim of this paper is to understand the mutual influences so that those barriers which are at the root of few more barriers (called driving barriers) and those which are most influenced by others (called dependent barriers) are identified.

Table 2 provides a summary of some of the main barriers found on agility in healthcare service in the operations and related literatures. Barriers are identified with the help of literature survey, discussions and interviews with doctors, nurses, supportive staff and relatives of patient at various hospitals.

Sr.No	Agile healthcare barriers	Author
1.	Lack of commitment from government, policies and support	Eman H. Alsabhan (2011), K. Muduli & A. Barve[2012], Rachelle Kaye et al. (2010).
2.	Lack of training and education	Laxmi Ghimire, Edwin van Teijlingen[2009], Eman H. Alsabhan (2011), Toni Tripp-Reimer et al.[2001], Chifa Chiang et al.[2013], Amritha Sobrun-Maharaj[2010], Medhat K. El-Shazly et al.[2011], Jay Strickland et al.(1996).
3.	Lack of motivation	Rachelle Kaye et al. (2010)
4.	Employee resistance	K. Muduli & A. Barve[2012],
5.	Cultural resistance	Chifa Chiang et al.[2013], K. Muduli & A. Barve[2012], Laxmi Ghimire, Edwin van Teijlingen[2009], Toni Tripp-Reimer et al.[2001], Chifa Chiang et al.[2013], Amritha Sobrun-Maharaj[2010], Medhat K. El-Shazly et al.[2011], Jay Strickland et al.(1996), Jennifer E. DeVoe et al.[2007], Anita Nudelman (2013), Sonia Marone [2007], European Health Management report [2012] / Professor Martin Christopher.
6.	Lack of time of service delivery	Chifa Chiang et al.[2013], K. Muduli & A. Barve[2012], Laxmi Ghimire, Edwin van Teijlingen[2009], Toni Tripp-Reimer et al.[2001], Amritha Sobrun-Maharaj[2010], Jennifer E. DeVoe et al.[2007], Anita Nudelman (2013), Sonia Marone [2007], Seonae Yeo[2002], Rachelle Kaye et al. (2010), Pamela I. Owens et al.[2002].
7.	Improper use of equipment's and preventive maintenance	Eman H. Alsabhan (2011), K. Muduli & A. Barve[2012], Rachelle Kaye et al. (2010), Amritha Sobrun-Maharaj[2010], Jay Strickland et al.(1996), Jennifer E. DeVoe et al.[2007], Anita Nudelman (2013), Pamela I. Owens et al.[2002].
8.	Lack of communication	Chifa Chiang et al.[2013], Laxmi Ghimire, Edwin van Teijlingen[2009], Amritha Sobrun-Maharaj[2010], Medhat K. El-Shazly et al.[2011], Jennifer E. DeVoe et al.[2007], Sonia Marone [2007], Seonae Yeo[2002]
9.	Financial constraints	Chifa Chiang et al.[2013], K. Muduli & A. Barve[2012], Laxmi Ghimire, Edwin van Teijlingen[2009], Amritha Sobrun-Maharaj[2010], Jay Strickland et al.(1996), Jennifer E. DeVoe et al.[2007], Anita Nudelman (2013), Pamela I. Owens et al.[2002].
10.	Lack of technological	Eman H. Alsabhan (2011), Rachelle Kaye et al. (2010), Jay Strickland et

Table 2.Summary of Barriers in agility in healthcare services

IV. EXPLANATION OF BARRIERS:

Ten most significant barriers of agile supply chain in healthcare have been identified through opinions of experts from healthcare service industry, academicians and literature survey. These barriers are discussed here.

1. Lack of commitment from government, policies and support (Health Policy Project. 2014.)

Developing a policy is just the first step; for policies to contribute to the successful delivery of health services, those must be effectively implemented. Challenges to implementation are referred to as implementation barriers.” They can be rooted in a variety of causes, including opposition from key stakeholders, inadequate human or financial resources, lack of clarity on operational guidelines or roles and responsibilities for implementation, conflicts with other existing policies, lack of coordination and collaboration between parties responsible for implementation, or lack of motivation or political will.

2. Lack of training and education

Old employees or employees near to retirement are not much interested for training for new things as well for new trends in healthcare industry like operating and training for new machines and techniques. Further this tendency is slowly percolate in other young employees and new concepts are not learn by these young employees too. Sometimes proper training is also not provided by government/private agencies and schedule for training is also not followed by concern agencies. Arrangement for vacation training and hands on practice as per proper schedule will eliminate this barrier.

3. Lack of motivation:

Self motivation and Motivational practices adopted by the Organisations are key dimensions associated with this barrier. Many a times rewards, returns and motivational practices are not adopted by higher authorities will lead towards ignorance of work and general practices.

4. Employee resistance:

Resistance of employees towards acceptance of new trends and policies will act as barrier for effective implementation of Agile supply chain. Generally employees are not in favour of accepting new things easily due to fear of loss of job, loss of monopoly in concern field. Policy makers must take employees in faith and then implement new policy to resolve this issue.

5. Cultural Resistance:

It is a big and serious barrier in healthcare. Generally Religion, permission from elder members, gender related difference will create hindrance in sharing the important information for effective implementation of agile supply chain in healthcare.

6. Lack of time for healthcare service delivery:

Geographical location, long travel distance of healthcare center, accessibility for doctors, gender difference, fear of lack of personal information will lead to delay which consequently reduces the timeliness and effectiveness of Healthcare services.

7. Improper use of equipments and preventive maintenance:

Lack of training and education as well as fear of mistakes while handling new sophisticated computerized equipments, lack of computer related knowledge will increase handling as well as maintenance of equipments.

8. Lack of communication

Language, gender difference, culture and fear of mistakes will lead to increase intensity of this barrier particularly in rural and religious countries.

9. Financial Constraints:

Expensive Medical Fees, lack of Insurance / Insufficient Insurance, unaffordable cost Of services, inability to pay for services, difficulty in paying for critical health services, payment for health services, financial constraints, ability to pay.

10. Lack of technological advancement

Fast and continuously changing technology in healthcare, new machines and equipments, application of computers in healthcare bring new and fast result oriented technology. But improper training and lack of proper education will restrict the effective and efficient usage.

5. AGILE CONCEPTS APPLIED IN HEALTHCARE:

There is also some anecdotal empirical evidence supporting the use of agile strategies in healthcare service delivery chains. Service chain integration is becoming more prevalent in healthcare, as team-based care models (e.g., the Patient Centered

Medical Home, or PCMH) are becoming standardized (Tom Christopher Rust, 2013). As of 2007, an estimated 27% of primary care practices follow some elements of the PCMH model, where disparate elements of the health care system (e.g., subspecialty care, hospitals, home health agencies, nursing homes) and the patient's community (e.g., family, public and private community-based services) are coordinated through a patient's primary care provider (Beal et al, 2007).

9. Discussion and Conclusion

Twenty-four to forty-two percent of women recognized that each of structural, financial, and personal/cultural barriers was preventing them from seeking health services. It was reported that structural barriers, namely distance and transportation to health facilities, commonly impeded the use of maternal health services in many low- and middle-income countries. The financial barrier was strongly associated with the use of medical treatment services. Personal/cultural barriers to women's use of health services have been investigated in various studies, which pointed out that women could not always have access to appropriate health services because of social and cultural constraints. Time allocation, family permission and concern about lack of female physicians are potential personal/cultural barriers. Research findings showed that fewer women recognized personal/cultural barriers as compared to those who recognized structural and financial barriers.

Time allocation was not a main barrier which statistically associated with the use of health facilities, although women in developing countries often have difficulty leaving their daily work and sparing time to visit health facilities even if they feel sick. It was reported that women in India and Pakistan had to ask permission from husband or head of the household to leave their home, including making a visit to health facilities. In Pakistan, lack of female health service providers had hindered women's use of appropriate and timely medical care. Some of the Literature revealed that structural and financial barriers were standing in the way of improvement of women's access to basic health services in the rural Upper Egypt, while the associations between personal/cultural barriers and use of the services were not verified.

The findings from our research might offer an insight into the problems of the health service delivery systems, and give the health policy makers some clues about how to make all population fully benefit from the health resources of the nation. Corporatization of healthcare has ushered in high – end services in hospitals. But the cost of availing such services is still too high for the common man, competition should be encouraged through enabling a framework where private participation is facilitated. The agile supply chain in hospital supply chain management deals with the management of hospital services and personnel to transform a sick patient into a healthy person in the shortest possible time with utmost satisfaction to patient.

Agile supply chain in healthcare services develops a personalized and customized relationship with the customers and identifies their additional needs. A good agile supply chain will provide a single view of each patient and services used. ASCM (Agile Supply Chain Management) enhances customer satisfaction, return on relationship, competitive advantage, number of consumers, customer value, revenue per customer.

ASCM reduces cost to acquire customers, time to serve.

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