

# MEASURING QR IN GLOBALISED APPAREL SUPPLY CHAINS

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## ABSTRACT

Substantial development has taken place, slowly, in the field of Quick Response (QR) since its evolution; however, the holistic view of it has been complex and fuzzy. The paper determines the dimensions and key elements of QR by identifying the essential virtues of a supply chain in a globalized environment and takes help of 3-dimensional concurrent engineering to develop a QR Practicability Tool-kit for future interpretation into a QR-rating model for measuring its adoption. The analysis is based on a critical review and synthesis from prior conceptual articles as a theoretical base. The work highlighted is expected to be beneficial for firms for developing value-added partnership (VAP), determining performance, re-configuring resources and aligning organizational activities.

**Key Words:** Apparel Supply Chain, Quick Response, Globalization, 3-dimensional concurrent engineering, QR Practicability Tool-kit

## 1. INTRODUCTION & LITERATURE REVIEW

Substantial development has taken place in the field of Quick Response (QR), and its conceptual growth, propagation and implementation in diverse industry perspectives. Growing complexity and volatility of demand has forced many industries to adopt an approach to recognize heterogeneity of products and demand as well as their underlying turbulence and intricacy [1]. Highlighted by impulsive & volatile consumer demands, short product lifecycles and low predictability the pressure on fashion and apparel value chains has become imperative. QR is a concept designed for such an environment to combat the increasing pressure of time compression [2], organizational alignment to demand, resource configurations, demand and supply linkages, high-end partnerships and primacy of information [1, 3]. QR since 1980's has evolved slowly as a holistic business concept, however, undoubtedly it has always been a complicated subject. Describing QR involves a certain degree of repetition; topics appear and reappear in different contexts; in illustrating its concept [4], however, no company or supply chain has implemented QR to 100% as reported in an investigation carried out by Fiorito *et al.* [5]. Perry [6] referred in his QR model, conceptual framework representing not only speed-to-market but also some of the vital aspects of QR competitiveness viz., pipeline and process waste reduction, increased inventory turns, information sharing and partnership [6, 7]. This has no doubt proliferated wider acceptance of a conceptual framework of the supply chain based on competitiveness. Many authors in defining QR have made several propositions, but hardly any single viewpoint could make a coordinated effort in comprehensively defining it until Lawson *et al.* [1, 8]. According to Hunter [4], the elements of QR had existed for several years, but the systematic fitting together of all pieces has been a very recent endeavor. It is obvious that QR in its total application is complex and fuzzy. Analysis by Lawson *et al.* [1] and Fiorito *et al.* [5] – on QR – emphasized on a study of implementation of the key elements of QR methodologies by various organizations in the supply chain. However, they adopt diverse aspects of QR to different degrees and thus a

unified conclusion cannot be drawn in comparing them and determine to what extent these firms or supply chains are successful in implementing QR.

The paper intends to present the basis of an evolving and effective QR Model, generic for globalized apparel supply chains, aimed to comprehensively relate all prescribed dimensions and elements generated into a framework, correlate them and understand their interactions. This analysis is based on an interpretive modeling of the interrelated variables influencing QR, developed theoretically, and categorized according to their driving power and dependence. Probably, Lawson et al. [1] fabricated the most comprehensive definition of QR almost 15 years after its origin, and the basis of the definition has been referred and analyzed, many a time, in developing the framework of the present paper.

In this context, it is exceedingly important to realize a few base components of the paper, briefly, viz., (i) what is a globalized apparel supply chain?, (ii) what are its characteristics, (iii) why is QR important in a globalized apparel supply chain?

A global apparel supply chain is made up of interrelated organizations, resources and processes that create and deliver products and services to end consumers essentially to compete all over the world, expand business operations, offer new services and applications to meet global customer needs and deliver a competitive advantage. Globalization of the apparel supply chain has been categorized under three main threads viz.; (i) international sourcing, (ii) international retail & logistics operations and (iii) internationalization of management ideas [9].

## **2. RESEARCH DIRECTION AND METHODOLOGY**

The first approach of this paper is to categorize the interrelated, yet diverse variables into a framework by means of an order imposed on the complexity of such variables. This starts with the identification of the dimensions or attributes of QR and its key elements, broadly but completely characterizing the term. For this purpose, a deductive analysis of innumerable definitions and concepts from earlier research works is followed.

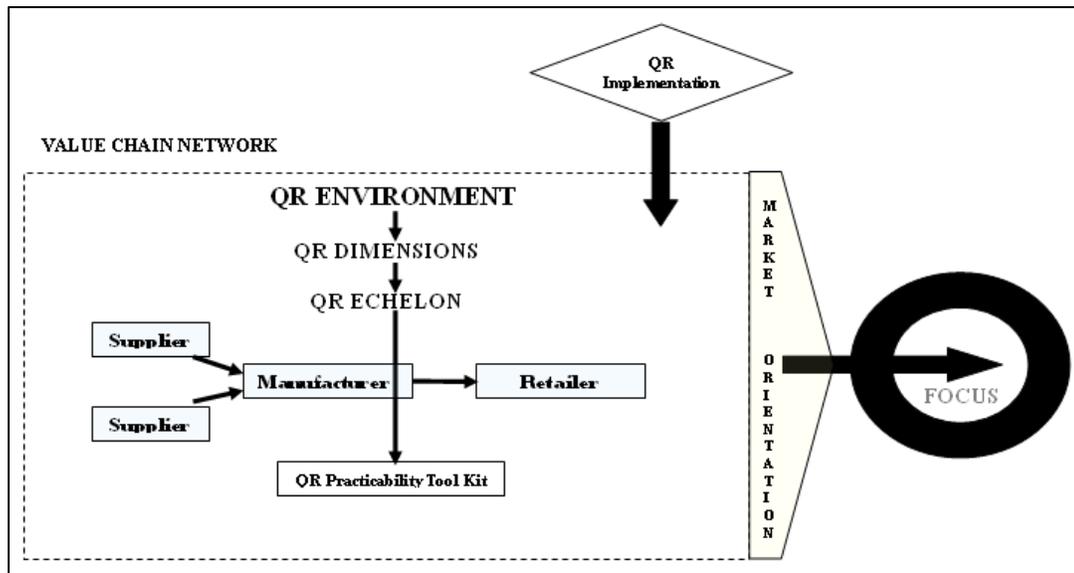
The second approach involves offering a base for QR rating for apparel value chains by developing a *QR Practicability Tool-kit* – components of which fit well within the QR ideology.

The overall structure of the work is based on deduction from a positivistic paradigm, starting with the construction of a theoretical frame of reference, and then sufficient hermeneutic interpretations made to construct the QR model. The viability of the work is subjected to future validation through empirical applications.

## **3. DISCUSSION AND ANALYSIS**

QR perspectives within a supply chain have gained critical importance to realize a firm's market-oriented strategy characterized by alignment of entire supply chain towards anticipation of customer needs and development of superior solutions for enhanced

business performance. There exists a logical fit between QR and Supply Chain Management (SCM) concept and market orientation approach [9]. Figure 1, based on a top-down deductive approach, provides a view of the supply chain and how QR dimensions and elements are synchronized within a holistic market orientation approach, towards customer value. The *QR Practicability Tool-kit* is the last tier of the model that is directly executed and checked for practical viability to devise QR rating for developing market orientation.



**Figure 1.** Top-Down QR – Dimensions & Elements – in Value Chain

A QR environment typifies a highly volatile, competitive and dynamic marketplace, surrounding an externally focused supply chain. This is inevitably linked to the practicing of a QR culture and its implementation for better interaction of the total system with the environment and building capacity for changes. The dimensions, virtues and key elements of QR outlined in this paper are aimed at increasing virtual networking for synergistic relationships dedicated to customers. This results in high enterprise flexibility and diversity encouraging responsiveness in the value chain essential to develop an open network co-ordination with integration and cross-functional processes.

### 3.1 Dimensions

Perhaps the most basic way in which the word *dimension* is used in literature, is as a synonym for *feature, attribute, aspect, or magnitude*.

QR is a *developing terminology*; since its origination, it has grown or has been caused to grow to become larger and advanced in meaning. To fragmentize the holistic concept of QR into essential broad dimensions or attributes, the work highlights the necessity of 4Rs [10]. According to Christopher [10], “as we move rapidly into the era of supply chain competition a number of principles emerge to guide .... These can be conveniently summarized as the 4Rs of responsiveness, reliability, resilience and relationships”.

Initially an attempt has been taken to relate this to the basic idea of QR of reaping maximum advantage of a “time-based competition”, promoted by Stalk [2].

### **3.1.1 Responsiveness**

The concept of QR by Lawson *et al.* [1] emphasized enhanced responsiveness, flexibility & continuous short-cycle innovation. Other references to the concept of *responsiveness* related to QR are also stated by Kincade [11], Lawson [8] in their works, illustrating its integral relation. Key parameters like need for speed-to-market, flexibility and market orientation could be broadly classified as responsiveness parameters. The concept of responsiveness was critically analyzed to remit it as an interaction of flexibility and agility [10]. Based on Kritchanchai *et al.* [12], “*responsiveness is the ability to react purposefully and within an appropriate time-scale to customer demand or changes in the marketplace, to bring about or maintain competitive advantage*”.

In several ways, flexibility contributes toward achievement of responsiveness within defined supply chain parameters by increasing competitiveness thus directing its association into the framework defined under responsiveness [13, 14]. Similarly, agility was coined to refer to the ability to adapt to unpredictable changes in the environment [13]. Several other sources [15-17] suggest agility to be a response to certain unforeseen changes thus integrally associating it to responsiveness. A QR total perspective – including flexibility & agility – thus encourages similar conception viably validating the proposition of responsiveness being one dimension of QR.

### **3.1.2 Reliability**

It is imperative to recognize the achievement of reliability in optimizing QR.

Quality is a vital component of QR [1]. A recent perspective of quality – Total Quality Management (TQM) – encompasses the core concepts of customer focus, quality, competitive benchmarking, synergetic partnerships, design for manufacture etc. essential for QR development [1]. Youssef *et al.* [17] have argued, “TQM affects not only quality but also the ability of the firm to become a time-based competitor”. Related to the present socio-cultural model of consumption one of the essential components to develop *quality* is through developing *trust*. Development of *trust* depends on transparency and knowledge dissemination in the system predominantly building upon superior reliability. This accounts for more system visibility and trust. *Reliability* in a value chain could ideally be delivering the product that customer requested at the right time, as promised by the seller. This builds on customer trust, supply chain quality and pipeline visibility. Thus a commitment towards the consumer-driven system has led to the development of a QR culture by stimulating TQM improvements through recognition, awareness, problem ownerships and involvement; the core of developing reliability.

### **3.1.3 Resilience**

The challenge to business today is to manage and mitigate the vulnerability or, precisely, risks to the supply chain. Christopher *et al.* [18] support similar findings, as they advocated; combating vulnerability has become a significant issue in today’s marketplace – characterized by turbulence and uncertainty. The reasons of uncertainty are very many but results in inducing risks and complexity in the supply chain.

Resilient supply chains are capable of withstanding and recovering quickly and effectively from unexpected disruptions. According to Christopher *et al.* [18], “*resilience is the ability of a system to return to its original state or move to a new, more desirable state after being disturbed*”, thus system flexibility and robustness are indispensable requirements to return to normalcy from the state of disruption [18]. The concepts of redundancy for better quality management also accounts for more supply chain reliability [19]. Sheffi [20] stated that flexibility, redundancy, robustness and risk management are essential characteristics to build a resilient supply chain.

Relating this to the concepts of QR, it is obvious to generate resilience in the value chain for increased flexibility, high-end quality and short-cycle innovations. QR fails to function unless the system is sufficiently resilient to resist disruptions, respond quickly and fulfill customer day-to-day demand changes. Resilience thus can be promoted as another critical dimension or *attribute* for QR deployment.

#### **3.1.4 Relationship**

A key component of QR strategy is the development of supply chain relationships. A number of authors have also identified the importance of supply chain relationships based on collaboration, partnerships, integrations and information sharing for QR [4, 8, 21]. It is realized that performance depends much on alliances and relationships to deal with changing market conditions. From the QR perspective, relationships and networks are critical and must be considered a key component of strategy for being increasingly competitive [1]. Coordination of performing activities in the supply chain requires consideration of *Relationship* as a major dimension of QR concept. Relationship in an apparel value chain could be inter-organizational at same or different levels (integration - horizontal or vertical respectively or collaboration), intra-organizational (collaboration based on organizational culture) or with customer (customer focus).

### **3.2 Multi-echelon model of QR**

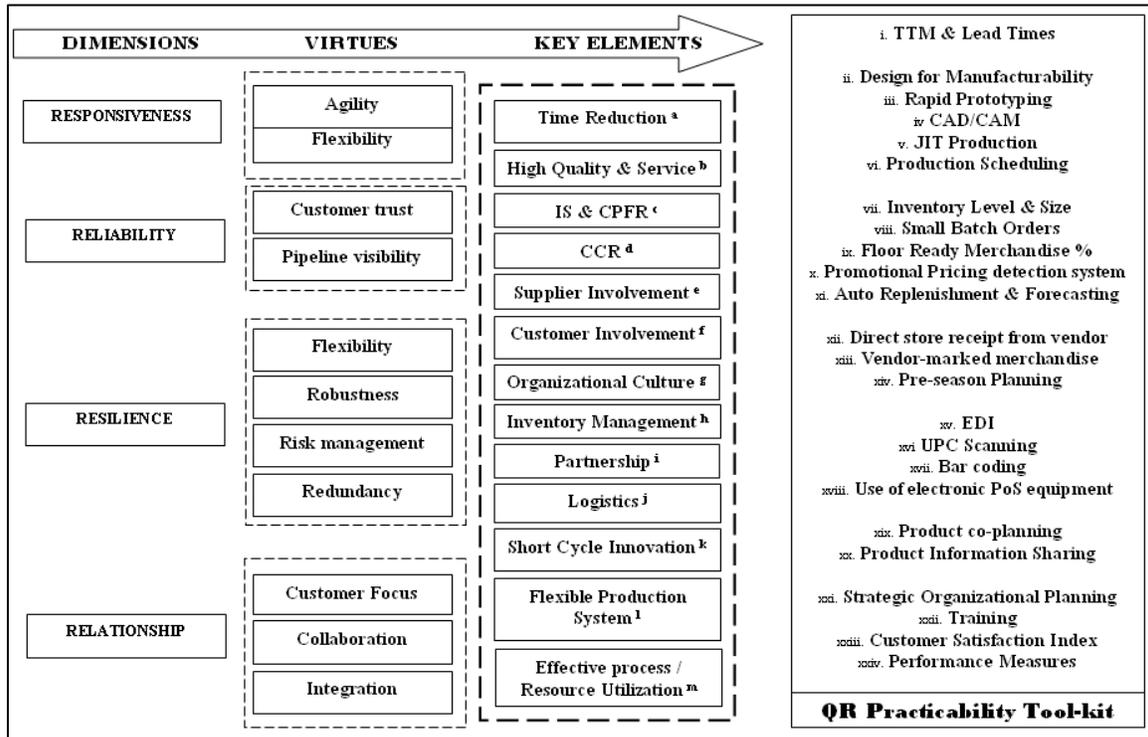
Development of a Multi-echelon model (Figure 2) of the QR concept is crucial for identifying the vantage points and cluster the key elements of QR intelligently grouped into smart dimensions and aligned for better QR performance and output.

Though relatively a new concept, 3-Dimensional Concurrent Engineering (3DCE) has developed sufficient corroboration to be conferred as a solution for increasing supply chain performance [22]. This essentially supports the decisive idea of identifying the key QR elements in terms of product-process-supply chain capabilities – elemental facets of 3DCE – for market alignment. The choice of QR elements was essentially based on analysis of the specific advantages that they highlighted. The broad competitive advantages of QR identified in the literatures [4, 23, 24] led to the identification of the key elements of QR listed in Table 1, and their relation with the prescribed QR dimensions leading to the development of the Tool-kit.

### **3.3 QR Practicability Tool-kit**

The QR Practicability Tool-kit was the last tier of the step-down echelon aimed at evaluating the extent of implementation of each element to generate the QR rating. The

development of the Tool-kit is related to the five broad QR Implementation aspects identified and the key QR elements to generate a link. Table 1 refers to the QR Tool-kit elements as an outcome of practical application or way of implementation of the QR key elements categorized under the interact-ability of the 3DCE dimensions. The identified elements of the Tool-kit are based on analysis and extension of earlier studies [1, 5, 23-



30] carried out related to QR Implementation and is aimed to generate viable options for measurement.

**Figure 2.** QR Dimensions, virtues and key elements – A multi-echelon system for QR Practicability Tool-kit development

**Table 1.** 3DCE and Key QR elements (based on Ellram *et al.* [22])

Key elements of QR	Adds to all 4R	Key 3DCE concept	QR Tool-kit Element
a. Time Reduction b. High Quality and Service c. IS / CPFR d. CCR			i,xxiii,xxiv xxiii,xxiv x,xi,xv,xvi,xvii,xviii,xiv x,xxiii,xxiv
e. Supplier Involvement f. Customer Involvement			xix,xx,xiv xix,xx,xiv
g. Organizational Culture h. Inventory Management i. Partnership j. Logistics			xx,xxi,xxii,xiv vii,viii,ix,xii,xiii,xiv xx,xiv ix,xii,xiii,xiv
k. Short Cycle Innovation l. Flexible Production System m. Effective process/Resource Utilization			iii,xiv ii,iv,v,vi,viii,xiv xi,xiv,xiv
	Product design/process design/supply chain design <sup>4</sup> Supply chain design/process design <sup>3</sup> Supply chain design/process design <sup>2</sup> Product design/process design <sup>1</sup>		

### 3.4 QR Implementation

The tenets behind QR implementation is to guarantee availability of desired merchandise, essentially, at the right time and place, besetting the problems of consumer demand unpredictability and market volatility but at the same time reducing excess stock holding [4, 25], and total cost of operating and mitigate risks and errors in demand predictions. QR strategy implementation is based on overall value enhancement of the supply chain through varied degree of innovation, partnerships and information sharing and communication essentially reconfiguring and aligning, effectively, the upstream processes and activities.

Analysis of a number of studies on implementation of QR concepts in the apparel industry [1, 5, 23-30] has led to the identification of drivers and tools for QR implementation categorized under five broad headings. They are (i) Information Sharing & Communication, (ii) Partnership, (iii) Added Value Assessment (AVA), (iv) Managing change & strategies and (v) Advanced Manufacturing Techniques (AMT) [31]. An analysis of these studies has led to the identification of the major elements for implementation under the broad categories as in Figure 3.

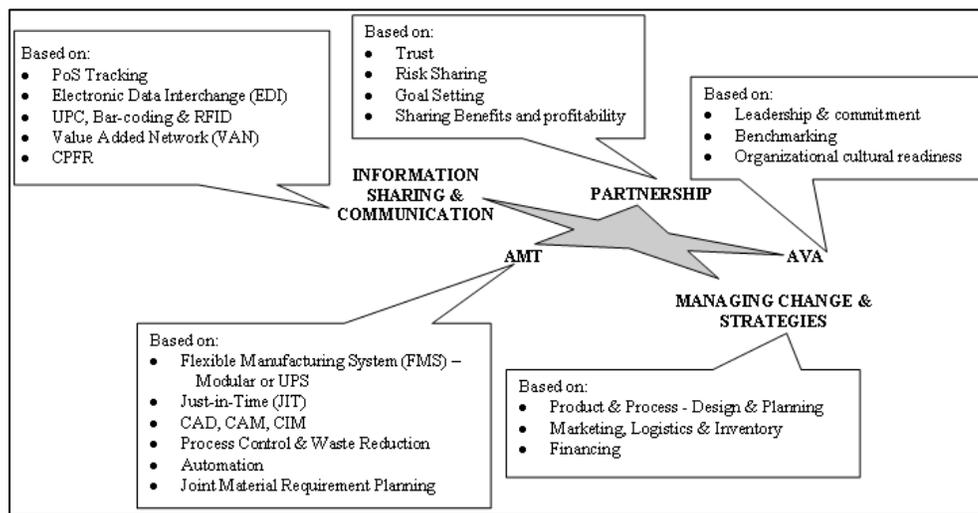


Figure 3. QR Implementation

### 4. CONCLUSION & FURTHER WORK

We now realize that a developed, concrete and holistic definition of QR could be as follows: *A comprehensive business strategy to continually meet changing requirements of a competitive marketplace that promotes responsiveness to consumer demand, encourages business relationships and reliability towards building of resilient value chain; by making effective use of resources and shortening the business cycle throughout the supply chain pipeline. Overall, QR is both - management paradigm and methodology that allows supply systems to be more market-oriented thus ensuring more customer value, competitive edge and improved performance.*

The research aimed to fabricate a comprehensive theoretical framework by relating the concept of QR to identification of its dimensions, their virtues and key elements intended to offer an answer to a broad question, “How much QR does an enterprise or its value

pipeline adopt?" It develops sufficient base for future development of a viable model for QR rating, through analysis developed from the *QR Practicability Tool-kit*.

The work, however, needs sufficient validation by empirical case studies (industry testing) run through smartly designed questionnaires and surveys. It is also obvious to determine span of the work, i.e., whether it is based on generalization of the type of enterprise (retailer, marketer etc.), type of retail (departmental or specialty stores, mass merchandisers etc.) and merchandise (basic, seasonal, fashion) and whether to concentrate only on the focal firm and its core activities or the entire value chain?

However, apposite development of the work is certain to be beneficial for enterprises and their supply chains in developing value-added partnership (VAP), determining performance, re-configure resources and align organizational activities.

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