

Impact of Food Value Chain Governance Determinants on Innovation competitiveness: Evidence from Kenya Horticultural Exporters

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Abstract

The objective of this work is to reassess Global Value Chain (GVC) determinants largely used in global value chain governance trade through interfirm relationship. These relationships rely upon external institutional frameworks on whose partner or cluster of firms have little influence other than their internally devised administrative mechanisms such as formal contracts and relational governance developed by the exchange partners. This paper is based on a survey of 83 horticultural exporters of fresh fruits and vegetables accessed out of 120 exporters registered with Fresh Produce Association of Kenya (FPEAK) and exporters who outsource their pack house activities at Horticultural Crops Directorate (HCD) pack house. Factor analysis was conducted using categorical principal component analysis (CATPCA) in order to also deal with the multicollinearity problem among categorical explanatory variables used. From the CATPCA output, five components were extracted and named as standards & certification, nature of transactions, level of supply chain integration, nature of contract and external contingencies; these components were considered to be the key food value chain governance determinants affecting the export oriented horticultural value chain in Kenya. Through multiple regression, these components were regressed on the dependent variable of competitiveness by product, process, marketing and organisational innovation. It is emergent and novel to this research that standards & certification schemes are taking a critical position in determining the various forms of food value chain governance. The research also corroborates the extant literature on the central role of nature of transactions, the level of chain integration and contracts administration in control and coordination of food value chains. The research also reveals that standards & certifications are impactful in competitiveness of the horticultural exports by creating competitive positioning through product, process and marketing innovations.

Keywords: Categorical Principal Component Analysis (CATPCA), governance structures, standards, contingencies, Fresh fruits & Vegetables, Kenya,

1. Introduction

Changes in agricultural and food standards have significantly affected the typology of agricultural value chains in the last two decades (Swinnen, 2014; Henson and Reardon, 2005; Jaffee 2003). Structural changes related to consolidation of retailers power or end-use markets, globalisation of supply chains (Lee, Gereffi, and Beauvais, 2012), amplification of multiple and diverse standards, certification and accreditations have been witnessed (Busch, 2011). Other significant contributors to these changes resonate to increased competition from global market participants, economies of size and scope in production and distribution (Martin Kang'ethe W Gachukia, 2015). The outcome of these changes has witnessed restructuring of new supply channels to meet new sources of demand, development new forms of production and processing that are lean, efficient and flexible (Zonin, Winck, Zonin, Leonardi, & Machado, 2014). Supply chain governance adjustments have as well been witnessed with trends moving from spot markets to market hierarchies and hybrid structures characterised by high levels of integration and alliances (Kherallah & Kirsten, 2002). This outcome seems straightforward and highly summative but in reality, the formative processes have had radical phases of readjustments before normalcy prevailed albeit as in to two decades.

Globally, the world economy has become increasingly integrated through trade liberalisations, international technology transfer, and greater mobility of capital and information; locally the global South, has seen a growing interest related catching up with the transitory changes that have largely been instigated from developments from the global North; this transition has been dubbed by Barrett, Ilbery, Browne, & Binns, (1999) as the Post-Productivist Transition (PPT). Kenyan horticultural sector within in the last two decades and specifically in the fruits and vegetable export has had to contend to PPT demands that started in the 1990s (Aggarwal, 2006).

The PPT was discerned as the onset of a period that embraced the whole food chain, from production, processing to consumer choices and marketing systems that have evolved to link them. This transition has been characterised as a paradigm shift, namely; first, a shift in procurement reorganisation and control from spot market to a modernised procurement system (Reardon, Barrett, Berdegué, & Swinnen, 2009); second, a shift from little or no standards to overreliance of private standards quality and safety largely driven by the EU retailer such as European Retailers Protocol for Good Agricultural Practice (EurepGap) currently known as GlobalGAP; third, the move from local procurement by individual stores, to centralized procurement using distribution centres, complemented with a shift to sourcing through national, regional, and global networks (p. 1719).

The effect of the PPT to small holder farmers/exporters in Kenya as well as other agri-based exporters from developing economies has not been a smooth transition; to start with, a huge decline in smallholders suppliers in Kenya from 7,000 farmers/exporter reported in mid-1980s to less than 3,000 in early 1990s (Jaffee, 2003) and a further decrease to less than 300 currently registered and active fresh fruits and vegetable exporters. This decline was linked to the demand pull concerns by retail buyers on issues such as consistency of product characteristic such as: product quality, presentation, product range, packaging and innovation (Humphrey, McCulloch, & Ota, 2004); maximum residue levels for pesticides and social and environmental concerns such as child labour and handling and use of pesticides. However, albeit recently, Henson, Jaffee, and Masakure, (2013) noted that smallholder farmers/exporter evidently play a key role in discharging risk by exporters, who combine their own production with that of smallholder farmers. Smallholder farmers have as well competitively met the supply demand, in terms of quality and price, reliability, flexibility, risk management and food safety compliance (Jaffee,

Henson, & Rios, 2011). This view also justifies partly the existence of hybrid forms of governance structure by way of lead firms and exporters being supplied by the individual small scale farmers or collectively by the co-operative groups and Self Help Groups (SHGs) and societies. Overall 65–80 per cent of all fresh horticultural imports from sub-Saharan Africa is marketed through the large multiple retailers (Barrett et al., 1999).

In line with this assessment of Kenya's post productivist transition this research reevaluates the governance determinants here proposed as standards and certifications, nature of transactions, nature of contract and supply chain integration as key governance determinants and how they affect competitiveness of Kenyan horticultural exports through product, process, marketing and Organisational innovation as spelt out by the Oslo manual (OECD & Eurostat, 2005). Overall, despite the rich scholarship in GVC research the dependence of its insights have largely been based on in-depth case studies including garments (Gereffi, 1999), footwear (Schmitz, 1999), electronics (Sturgeon, 2002) and horticulture (Dolan & Humphrey, 2000); the call for empirical testing by scholars such Dallas, 2015; Gellynck & Molnár, 2009; Ghosh & John, 2005; Hammervoll, 2011 is in this research seconded for corroboration of the foregoing case study method. This paper utilises survey data from 83 export horticultural firms to assess the various governance determinants affecting the export oriented horticultural value chains. This paper seeks to fill on this existing knowledge gap.

Subsequent sections of this paper are structured as follows. First, research methodology adopted in outlined. Second, Theoretical review based on transaction cost economics and global value chain principles are elaborated while linking to the literature on the value chain governance determinants and competitiveness through innovation; fourthly, data analysis and discussions are followed and finally, conclusion is made by way of drawing inferences.

2. Methodology

A general review of the GVC literature provided the foundation of this study. A cross section survey was conducted to collect data that was used to test hypotheses. A census survey was adopted due to the small proportion of the population of one hundred and twenty exporter firms in the horticultural export sector; this was opted for in line to Israel, (1992) recommendation whereby, census is appropriate for two hundred or less units since it eliminates sampling error and provides data on all individuals in the population with precision and accuracy; however Bartlett, Kotrlik, and Higgins, (2001); Krejcie and Morgan, (1970) propose samples for fewer populations. The study was conducted in between the months of November 2015 and January, 2016; the accessible population were either the owners of the exporting companies, their agronomists, quality assurance officers, or pack-house managers/supervisors. A semi-structured questionnaire was used. Both the study and targeted population consisted of a 83 respondents representing 69 percent of the 120 exporters registered with both fresh produce exporters association of Kenya (FPEAK) and Horticultural Crops Directorate (HCD) in Kenya.

Data was analysed using SPSS version 24 with the categorical principal component analysis (CATPCA) reduction feature also known as nonlinear principal component analysis (PCA) (Linting and van der Kooij, 2012; Meulman, Van der Kooij, and Heiser, 2004) owing to the categorical nature of the variables under the research study. The use of CATPCA was aimed at reducing the observed variables to a number of uncorrelated principal components which are explained as the key components associated to food value chain governance determinants on the competitiveness of Kenya's horticultural exports through innovation.

3. Theoretical Review

3.1. *Transaction Cost Economics Theory*

The main focus of Transaction Cost Economics (TCE) is to define the main structures and coordination of transactions through markets or hierarchies. Transaction costs are conceived as the costs of carrying out any exchange, whether between firms in a market place or by transfer of resources between stages in vertically-integrated firms. Hobbs (1996) separates transaction costs into three components: *information costs* that are related to information about products, prices, inputs and buyers and sellers; *negotiation costs* that arise from the physical act of the transaction especially in writing of contracts, and *monitoring costs* that emanate after an exchange has been negotiated.

TCE relates to two main assumptions, human behaviour and environmental characteristics. The assumption about human behaviour further relates to opportunism and bounded rationality. Opportunism as defined by Williamson (1979) as 'self-interest seeking with guile' recognises that businesses and individuals sometimes seek to exploit situation(s) to suit their own advantage. In as much as opportunism may not be prevalent, the theory however recognises it as often present in some instances. TCE also views humans as bounded rational individuals who, although they may always intend to make rational decisions, have physically limited capacity to evaluate accurately all possible decisions and alternatives. Bounded rationality recognises this human limitation in the countless complex situations and future uncertain events (Selten, 1990). To the human behaviour assumption and in terms of governance, Madhok, (2005) views the principles of transaction cost analysis promoting trust, reciprocity, opportunism and forbearance (TROF) on the discussion of governance under the means of promoting ownership and control. On the other hand, the assumption about environmental characteristics further elaborates asset

specificity, uncertainty and frequency of transactions. Asset specificity as defined by Williamson (1985) is ‘a durable investment undertaken in support of particular transactions’ asset specificity ensures that resources in a given transaction relationship are not transferable to other activities (Greenberg, Greenberg, & Antonucci, 2008). Williamson (1989) elaborates six asset-specific types related to site specificity, physical asset specificity, human asset specificity, dedicated assets, brand name capital and temporal specificity.

In particular the environmental characteristics of specificity, uncertainty and frequency of transaction to the Kenyan horticultural sector would be considered as per the following characteristics; namely: Asset specificity, this characteristic elaborates the length of the crop production cycle, the longer the period the higher the specificity; the scope for scale economies in processing and post-harvest operations would be considered to be low if there was minimal processing required; the degree of specialization of material production inputs and technical knowledge. Temporal specificity characteristic is considered to be low for products with a longer perishability span such as fruits compared to fresh vegetables. While uncertainty would be assessed from the degree or rate of commodity perishability; the degree of specificity in the commodity quality required and the degree of specificity in the timing of harvests and crop deliveries (Jaffee, 1993); Table I outlines the nature of transactions specifically related to fresh vegetables and fruits.

Table I: TCE Environmental Characteristics

	Asset Specificity			Uncertainty			Mode of Coordination during		
	Production Cycle	Scale Economies	Input Specific	Perishability	Quality specific	Timing Specific	Wholesaling Phase	Processing Phase	Retailing Phase
Vegetables	short	Low	low	med	med	med	spot	S/t	S/t to L/t
Fruits	long	Med	low	med	med	med	spot	L/t	L/t & VI

L/t long Term, S/t Short term; VI Vertically integrated

Source: Authors

To Jaffee (2003) uncertainty characteristic contrasts with the perfect information assumption of the neo-classical economists. Information about the past, present and the future state is not perfectly known for various reasons; in such a state it would be difficult to determine *ex-ante* opportunistic behaviour as well as confirm *ex-post* bounded rationality. It would be prudent to consider these aspects in the light of contract formulation for the unanticipated changes in circumstances surrounding a transaction (Ji, Felipe, Briz, & Trienekens, 2012). Owing to uncertainty, the formulation of contracts *ex-ante* and the ability to verify compliance *ex-post* have largely led to emergence of incomplete contracts and thus the recourse to implement standards and regulations as well as third party means of certification (Busch, 2010; Hatanaka, Bain, & Busch, 2005). The frequency of transaction assumption implies that if transactions are infrequent, then the cost of alternative governance structures may not be justified. Therefore, the

volume, number and/or time spread in transactions are important considerations. If transactions are infrequent, alternative governance structures may not be necessary.

The provisions of TCE are corroborated by Martino & Perugini, (2006) as they opine that the subject of food safety is relevant to quality, information asymmetry, uncertainty, opportunism and governance structures. These authors characterise food safety by the following features: (i) a typical asymmetric information regarding the upstream and downstream supply chain actors, (ii) poor quality is punished by the market while lack of safety may involve legal sanctions, (iii) attainment of safety standards entails a huge investment of various resources; (iv) these unique features, entail the need for coordination along the food supply chain (Martino & Perugini, 2006: 435).

3.2. Global Value Chain Analysis

Prior to global value chains (GVC) literature was the Global Commodity Chains (GCC) literature. The underlying theme of governance in GCCs as previous developed by Gereffi (1994), relates to governance as a driver where much of the attention was in line with the trade-off between producer driven versus buyer driven governance forms (Dolan, Humphrey and Harris-Pascal, 1999; Minot & Ngigi, 2004). Value chain nuance was later adopted to briefly broaden the understanding of how producers at upstream nodes of production are linked with their end markets, including retailers at downstream nodes.

Value chain governance concept has been promoted as consequence of the emergent new approaches to supply chain management largely based on allocation of resources to core competencies and an increased trend towards outsourcing and sub-contracting of non-core

functions. This trend has resulted to a general loss of control over the stages of production and distribution process especially to geographically dispersed regions. Vurro, Angeloantonio, & Francesco, (2009) explain the rationale of broadening the concept of value chain governance from inter-firm relationships to global *fora*; this is due to the coincidence of falling regulatory barriers to international trade, advances in communication technologies and declining transportation costs. The rise of global value chains are found largely in industries that a largely labour intensive. GVC studies therefore continue to explore how changes in the organisation and coordination of global trade and production characterised by the splitting up of production processes between countries (Keane, 2012); and in particular to this research assesses the relations of governance at a distance by virtue of traceability systems.

Exposition on supply chain governance resides on the conceptual understanding of governance structures and the different governance typologies that are manifested. Going by Ebers & Oerlemans (2013) definition, a governance structure is understood as a mechanism that coordinates and controls economic transactions; these mechanisms include administration of decision-making procedures, adjudication of residual rights of control, contractual agreements, pricing monitoring, formal rules and regulations, and procedures for negotiations, conflict resolution (p. 7). Governance typologies on the other hand were scaled up by Gereffi's seminal work (1994, 2001) following Williamson's research on governance as viewed from extremes of market or hierarchies, these typologies were largely viewed as either being buyer driven versus producer driven forms of governance. Producer driven commodity chains being found in capital intensive sections that require a huge capital outlay; while buyer driven governance, relating to retailers or markets providing the leading role in managing the supply chains.

Gereffi, Humphrey and Sturgeon (2005) elaborate that due to the wide range of inter-firms governance types in the global arena, there is the realisation of complexity of inter-firms relationships in the global economy. To them, “the key insight is that coordination and control of global scale production systems, despite their complexity, can be achieved without direct ownership” (Gereffi, *et al*, 2005, 81). The view of governance as coordination, emphasizes global value chains compared to the view of governance as driver that is based on the understanding of global commodity chains. This nuance points to the value dimension of the coordination.

The typologies by Gereffi *et al* (2005) include governance by market relations, modular value chains, relational value chains, captive value chains and Hierarchical value chains. Significant to these types of governance structures are the characteristics or determinants related to complexity of transactions, ability to codify transactions, capability of the supply base and degree of coordination and power asymmetry (Gereffi *et al*, 2005; Gibbon *et al*, 2008). This research reassesses Gereffi’s *et al* (2005) and Gibbon’s *et al* (2008) determinants by assessing complexity of transactions and ability to codify transactions as elaborated in nature of transaction and standards & certifications respectively; while the degree of explicit coordination and capability of supply-base and power asymmetry are elaborated under the principles of supply chain integration, coordination & control; Lastly, the degree of explicit coordination and power asymmetry is assessed under the nature of contract determinant; this view is also opined by Vlachos' (2014) four categorisation of supply chain governance typologies namely spot markets, standards, contracts and vertical integration. Table two summarises these relationship of the various governance types and their determinants as appraised by Gereffi *et al.*, (2005).

Global food supply chain systems seem to combine all the three aforementioned determinants of governance. Martino & Perugini (2006), contextualise the need for a proper governance of food supply chain in relation to food quality and safety.

3.3. Innovation and Innovation Systems

Innovation has received considerable attention as having a crucial role in securing sustainable competitive advantage. Innovation includes advances in the products, production processes, management systems, organizational structures, and strategies developed by a firm. Innovation systems approaches are often based on commodity value chains in which knowledge and/or research products are marketed and processed for sale and consumed (Adekunle et al., 2012); the context of these innovations promote sectoral systems of innovations which largely constitute the basic elements of products, agents, knowledge and learning processes; basic technologies, inputs, demand, and the related links and complementarities, mechanisms of interactions both within firms and outside firm and Institutions (Malerba, 2002).

While the elements of sectoral systems of innovation come into play governance mechanisms to link these elements remains fundamental. Governance as largely conceived in GVC's literature is particularly important for the generation, transfer and diffusion of knowledge leading to innovation; its however noted that innovation to most developing economies follows a slightly different path, Humphrey & Schmitz's (2002) opine that this form of innovation to developing economies is considered to follow the broad perspective of firms acquiring capabilities which are new to them even if they might have existed elsewhere previously. Pietrobelli and Rabellotti (2011:1262) corroborates this view by noting that innovation systems (IS) in developing

countries as well do not necessarily have a straightforward development path; to them IS in developed economies is more incremental with absorption of knowledge and technology being more frequent than radical and new to the world. While in the industrialised economies focus on R&D, in most developing economies the technological effort is based mainly on firm-level activities which are not included in formal measures of innovation.

4. Conceptual Model and Hypotheses Development

Nature of Transaction

Nature of a transaction is largely characterised by frequency, complexity and cost of a given transaction and the ability to codify the said transaction (Gereffi et al., 2005). Frequency of transaction is related to the number of repetitions of a transaction in a given period of time. The changes in transaction characteristics should determine the variation of transaction costs, such as information, negotiation, and monitoring costs (Banterle & Stranieri, 2013). Higher frequency of transactions brings familiarity to contractual parties with the exchanges in which human actors in charge of operations interact with one another; this more often, builds personal trust in relationships. As the level of trust increases, personal integrity may suppress opportunism and then reduce the degree of uncertainty. Agri-food supply chains continually improve due to stronger supply chain capabilities associated with increased coordination, information exchange, and responsiveness of the organizations involved, however, in globalised supply chains, the need for formal contracts cannot be downplayed especially due the rise of uncertainties, complexity of transactions, cost of transaction and inability to codify transactions.

Complexity of transactions in this research follows from contribution by TCE theory. This theory first suggests that reducing complexity in transactions is sought by seeking efficient governance structures and secondly it suggests that, clarifying capability roles through reduction of the incompleteness of contracts is important for supply chain management (Williams, Maull, & Ellis, 2002). Specifying more simply, an efficient supply chain architecture is one that reduces transaction costs while affirming that complexity in production chains is strongly determined by product nature and spatial complexities in terms of multiple destinations with standards heterogeneity. The determinant on nature of transaction therefore specifies the first hypothesis, namely:

H1: Nature of transactions has a positive influence innovation competitiveness of Kenya's Horticultural exports by:

H1a Product Innovation,

H1b Process Innovation,

H1c Organisation Innovation and

H1d Marketing Innovation

Nature of Contract

Nature of contracts generally spells out the binding terms of engagement. Contracts, as governance mechanism, are designed to attain two main objectives: first, to delineate authority and responsibility structure; and two, to share risk among chain partners (A. Ghosh & Fedorowicz, 2008; Vlachos, 2014). According to Ji et al., (2012: 131) part of this risk is attributed uncertainty; these are the unanticipated changes in circumstances around a transaction. Due to uncertainty, formulation of contracts *ex ante* and the ability to verify compliance *ex post* has largely led to emergence of incomplete contracts. Part of the challenge related to incomplete

contracts as Cannon, Achrol, & Gundlach, (2000) affirm is that when a transaction involves relationship-specific adaptations and is (1) subject to dynamic forces and future contingencies that cannot be foreseen or (2) involves ambiguous circumstances where tasks are ill-defined and prone to exploitation, the difficulty of writing, monitoring, and enforcing contracts is increased and their overall governance effectiveness weakened. In each case, efforts to govern the relationship on the basis of detailed and formal contracts- without the benefit of some additional clauses-are not likely to enhance performance.

Nature of contract is also construed to be related to aspects of rights and obligations of the contracting parties. Some forms of contract include marketing contracts, production contracts and contract farming. As such, marketing contract represents an agreement by a buyer to provide a market for the seller's output. In this arrangement, the seller transfers some risks and decision over when and how the product is to be sold to the buyer. Production contract on the other hand exists where the buyer supplies and manages all the inputs on the farm and the farmer usually becomes simply a supplier of the land and labour. Next in the supply chain continuum, there is the contract farming which refers to the system of production and supply of products by farmers to the buyers under forward contracts (Gyau & Spiller, 2008).

While nature of contract as a governance instrument is clearly conceptualised, innovation and contract forms do not appear to be clear. To some the question of whether there is a link between innovation and contract forms can be perceived to be positive especially in production contracts and contract farming where the argument for efficiency and output rewards both effort and innovation due to increased production; yet to others there is no clear relation existing between tenancy and the adoption of agricultural innovations. Despite limitations associated with uncertainty compared to innovative gains, parties continue to contract to safeguard their interests

as related to ownership rights. Ownership rights are in the economic sense construed as property rights; these rights offer most effective mechanism for providing economic agents with appropriate incentives to create, maintain, and improve assets (Chaddad & Iliopoulos, 2013; Chaddad & Cook, 2004). To Madhok (2005), ownership centred approach allows for control, which in turn allows flexibility over decision-making and adaptability; as such this research vouches for organisational innovativeness being promoted by innovation as well as the relation between the pace of technological innovation and contract production. Contracts may as well facilitate innovativeness if demanded by the principals to their agents.

The analysis of the formal allocation of ownership rights accordingly identifies that governance models as related to the extent to which members engage in decision management and decision control functions (Chaddad & Iliopoulos, 2013) may promote innovations through contracts This determinant therefore specifies the second hypothesis, namely:

H2: Nature of contract is positive related to innovation competitiveness of Kenya's Horticultural exports by:

H2a Organisation Innovation and

H2b Marketing Innovation

Supply Chain Integration

Integration is the quality of collaboration that exists among clusters actors to achieve an effective, efficient and united system (Maleki & Cruz-machado, 2013). Supply chain integration (SCI) refers to the degree in which a focal/lead firm strategically collaborates with its supply chain partners and collaboratively manages intra and inter-organization processes (Flynn, Huo, & Zhao, 2010). The eventual goal of SCI is to achieve effective and efficient flows of products

and services, information, money and decisions, in order to provide maximum value to the end customer (Martin Kang'ethe W Gachukia, 2015).

The seminal work by Frohlich & Westbrook, (2001) spells out that forward integration in SCI promotes the flow of materials and services while backward integration promotes sharing of information from customers up to the suppliers. Supply chain integration indicators have been articulated differently by various scholars; to some SCI consist of internal integration and external integration (Maleki & Cruz-machado, 2013; Tomas, Rosales, Batalha, & Alcantara, 2014); to others SCI includes product integration and process integration (Huo, Qi, Wang, & Zhao, 2014) yet other scholars have within external integration alluded to both supplier and customer integration (Tomas *et al.*, 2014). This study focuses on the supply chain integration from the view of internal integration-to include both product and process integration from the internal operation of exporters (Helmi, Hua, & Mohd, 2013), and external integration to include the linkages of the exporters' upstream suppliers and downstream customers through customer integration (Boon-itt & Wong, 2011).

Supply chain integration is required internally within and across functions and externally across suppliers and customers (Boon-itt & Wong, 2011). Internal integration is characterized by full systems visibility across functions such as procurement, production, logistics, marketing, sales, and distribution. It is a key driver of competitive advantage in supply chain management (Van Hoek & Mitchell, 2006). The goal of internal integration is to develop a process-oriented focus; a focus on coordination across functional areas (Richey, Roath, Whipple, & Fawcett, 2010). External integration involves the effective alignment, information sharing, and participation in the interactions between firms their suppliers and customers.

Supplier integration is as well viewed as a cooperation, coordination and collaboration (Moharana, Murty, Senapati, & Khuntia, 2012) by including joint efforts in product development, problem solving, technology exchange among others. On the demand side of a supply chain, firms discern into the customer organization(s) to understand their product, culture, market and organization in such a way that they can respond rapidly to the customers' needs and requirements. Both Supplier and customer integration focus on coordination and collaboration efforts that occur among supply chain members. Agri-food supply chains continually improve due to stronger supply chain capabilities associated with increased coordination, information exchange, and responsiveness of the organizations involved. The degree of coordination is largely affected by factors related to changing consumer preferences, increased need for information management, advancement in biotechnology and environmental concerns; due to these factors there is increased movement from spot market type of governance to more closely coordinated forms of governance focusing on relational or vertically coordinated forms of governance. Therefore the level of coordination can be related to a particular form of governance where the levels of risks and returns associated.

Literature as well supports that integration with suppliers and customers helps firms improve performance in innovation, and it suggests that the degree of integration is a determinant factor in the innovative performance of firms (Nogueira Tomas et al., 2014). Innovativeness in the supply chain context is also influenced by the relationship orientation between two or more actors in the supply chain. As a result, supply chain integration aims at promoting interdependency, structures or formative relationships which are communicative through exchange of information, collaborative alignment, competitiveness and innovative performance (Engelseth, 2009). This determinant therefore specifies the third hypothesis, namely:

H3: Supply chain integration has a positive influence innovation competitiveness of Kenya's Horticultural exports by:

H3a Product Innovation,

H3b Process Innovation,

H3c Organisation Innovation and

H3d Marketing Innovation

Standards and Certifications

Barling (2008) captures the subtleties in which governing has continually transitioned to governance; to him while the concept of governing relates to command and control, mostly by the State or agency in power there has been the lessening of States' control over economic sectors by way of seeking to extend its regulatory and strategic reach, partly through new governance forms. According to Humphrey (2006), value chain coordination is not led by competitive strategies and lead firms but also by standards; standards in the food industry continue to play a significant role.

To Gachukia, (2016), governance of food and agriculture commodities on a regional and global level are increasingly becoming influenced and controlled by both corporate and retail actors through private governance mechanisms such as quality and safety standards, private codes of conduct, ethical trading and appeal to corporate social responsibility. Significantly, retail actors have established bodies such as Euro Retailer Produce Working Group for Good Agricultural Practice (EurepGAP) and Global Good Agricultural Practice (GlobalGAP) (Mausch, Mithöfer, Asfaw, & Waibel, 2009) which have imposed private regulations with regulatory protocols

relating to pesticide residues, field and pack house operations, and traceability (Narro, Roy, Okello, Avendaño, Rich & Thorat, 2009; Okello, Narro, & Roy, 2011) these have been implemented albeit voluntarily to FFV exporters who wish to be prequalified to the premier retailing outlets in the developed countries. To these exporters in the developing economies, this trend means further implementation of requisite resources and infrastructure in order to remain competitive while striving to meet the set certification, standards and regulations.

According to Busch, (2010) standards, play a vital role in the new globalized economy as they often replace formal legal frameworks with far more flexible and responsive law-like rules and regulations. To Busch (2010):

These differentiated standards allow firms to discipline suppliers as well as to reduce the pressures of price competition...They are market-driven in that the sanctions involved for noncompliance are not enforced by the state, but by the market. Yet it is precisely this fact that has to date made this form of governance largely invisible (Busch, 2010:67).

Although standards are hardly sufficient to a new governance regime, effective governance through standards has incorporated additional features normally found in legal regimes. These legal regimes are characterized by Busch (2010) as Tripartite Standards Regime (TSR) that consist of standards, certification, and accreditations. TSR develops a chain of proofs through the process of having standards approved by certified bodies and further, these certifying bodies have to be accredited to do the certifications; this constitute the TSR regime. Respectively, this process is characterized into three certification levels; first level involves party certification where the seller certifies to the buyer that the product meets standard. Second level certification involves the buyer checking to ensure that the good or service offered by the seller meets the standards while third level involves Third-party certification (TPC). TPC involves independent agencies doing the checking and reporting to both the buyer and the seller. As the certifiers take up their roles, the process of TPC is put to question. How are we to know that a given certifier is

reliable? The solution is to create bodies that accredit certifier attesting to their conformity to the proper standards of the certification (Busch, 2010: 67-68; Hatanaka, Bain, & Busch, 2005); a further ramification of the entire process. To Jahn, Schramm, & Spiller, (2005) this process is overtly costly and to Gellynck, Verbeke, & Vermeire, (2006) this third party certification process mostly favours procurement agencies in their acquisition strategies compared to the ultimate consumer to whom the certification is mostly designed. This study therefore focused on the independent variable of standards and certifications under which various standards, certifications and Quality assurance schemes were considered; the following hypothesis was thus be tested.

H4: Standards & Certifications has a positive influence innovation competitiveness of Kenya's Horticultural exports by:

H4a Product Innovation,

H4b Process Innovation,

H4c Organisation Innovation and

H4d Marketing Innovation

Figure 1 presents the conceptual model with hypotheses.

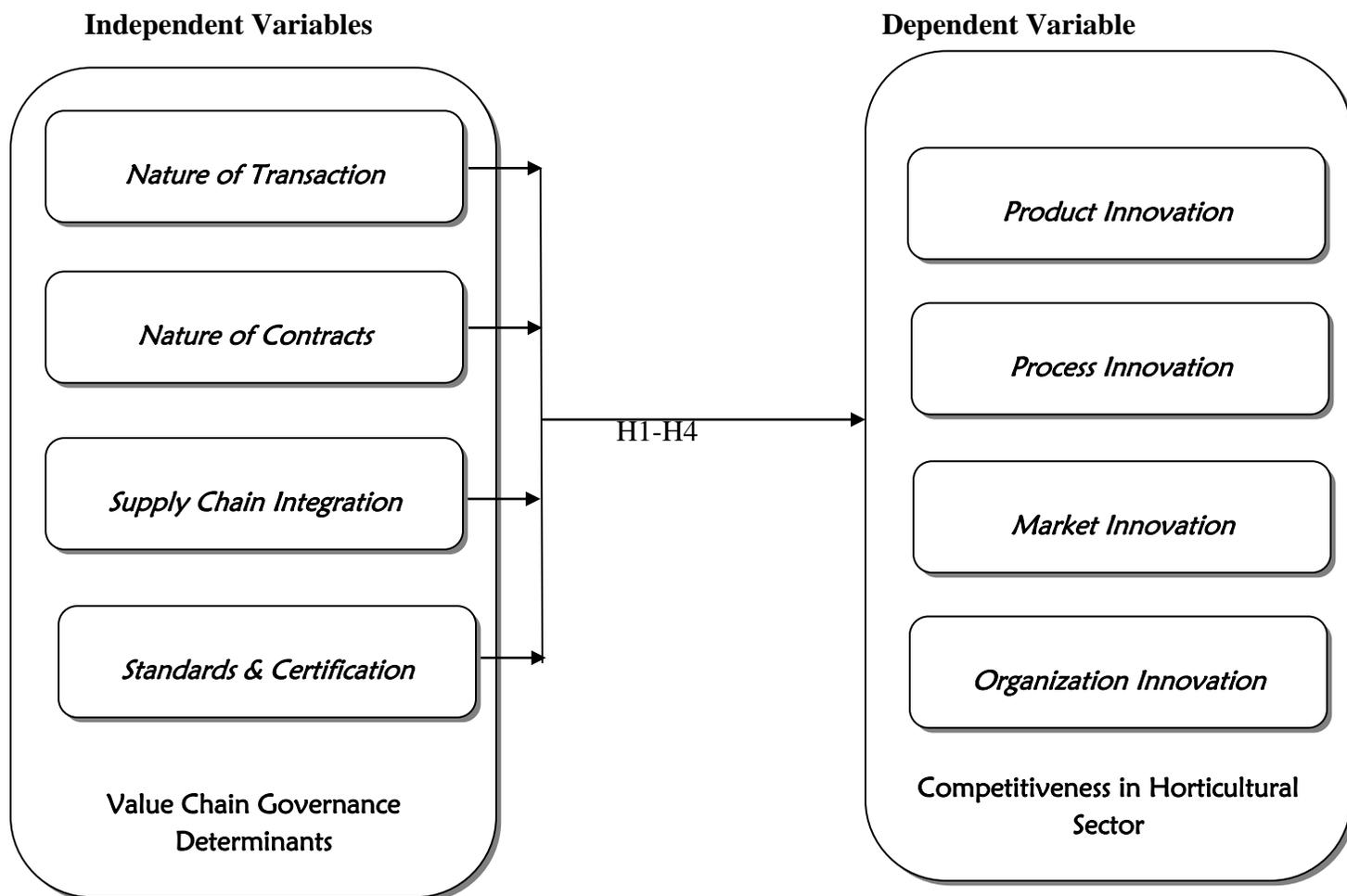


Figure 1. Conceptual Framework

5. Research Findings and Discussion

There were 120 fresh fruits and vegetable exporter firms targeted from whom 83 responded to the survey, a response rate of 69 percent was achieved. The sector demographics indicated that, ownership of the exporter firms relate to sole proprietorship, partnership and limited liability companies, these were respectively represented in percentages of 8.4, 7.2 and 84.3. The age of the exporter firms represented in percentage and categorised in the range of firms below 5 years, 6-10 years, 11-19 years and 20 years and above was 31.6, 25.0, 26.3 and 17.1 respectively.

Majority of the exporters representing 66.3 percent were involved with exports of both fruits and vegetables while exporters who dealt exclusively with vegetables and fruits represented 21.7 and 7.2 percent respectively; 4.1 percent of the exporters exclusively dealt in processing of both or either fruits and vegetables. Export destinations for Kenyan fresh fruits and vegetables is largely dominated by Europe Union, specifically to United Kingdom, Netherlands, France, Germany and Sweden other regional destinations include Middle East and Eastern and South Africa.

Two phases of CATPCA analysis were carried out; The first phase for the analysis was to assess significant indicators elaborating on the individual variables of nature of contract, standards and certifications, supply chain integration and nature of transactions; the second phase entailed a joint CATPCA for all the factors that with significant loading to all variables for the purpose of further analysis of their effect to competitive advantage of Kenya's horticultural export sector.

Initial CATPCA phase was carried out independently to the four supply chain governance variables namely nature of transactions, nature of contract, standards & certification and supply chain integration in order to ascertain the indicators with factor loading of 0.4 and above; indicators with factor loading of 0.4 and above were therefore retained for the purpose of the joint CATPCA analysis. First, under the variable of nature of transactions the following eight indicators were selected; type business ownership (0.720); countries of export categorized (0.675); frequency of export (-0.423); outsourced factors production, processing & logistics (-0.613); exclusive agreements with importers (0.699); direct orders from European retail (-0.591); selling through middle merchants (0.599); use of export processing village (0.563). The second variable of Standards & Certification had the following six indicators, namely: good agricultural practices (gap) in place (1.143); gaps audits conducted (1.143); categories of standards place (-

0.753); documented procedure for recall (0.696); conducted mock recall (0.771); products guarantee to importers, retailers or ultimate consumers (0.752).

Thirdly, the variable under nature of contract garnered ten indicators which included the following type of contract arrangements: import oral contract (-0.420); import sales contract (-0.540); import production & sales contract (0.590); supplier oral contract (0.414); supplier sales contract (0.571); supplier production & sales contract (0.585); brokers engagement (0.643); engage brokers in oral contract (0.512); engage brokers in sales contract (0.651); engage brokers in production & sales contract (0.627). Finally, the fourth variable under value chain integration had the following seventeen indicators that had a Cronbach's alpha of 0.4 and above, these indicators included responses of exporters the following statements: we have a strong internal information sharing (0.518); we engage in joint management decisions (0.783); we engage in interdepartmental meetings (0.801); we have open door policy (0.636); we establish close supplier contact (0.802); we share customer feedback with our suppliers (0.924); we share our supplier forecast with customers (0.802); we involve our supplier in quality inspection (0.782); we establish close customer contact (0.802); we involve our supplier in quality inspection (0.782); we establish close customer contact (0.802); decision making is communicated to our suppliers & customers (0.983); we collaborate with regulators (0.439); we emphasis openness (0.985); we have strong corporate relations (0.793); we have quality monitoring in place (0.987) and we coordinate in quality control issues (0.598).

The selected indicators representative of the four supply chain governance variables were in the second phase subjected to a joint CATPCA analysis in order to ascertain the uncorrelatedness of their joint effect in respect to nature of transaction, standards & certifications, nature of contract and supply chain integration variables. Table 1 summarises the output of the results and their

loadings. The result of the output loadings realised five dimensions; specific to each dimension, factor loadings of 0.4 and above were retained for the purposes of running regressions. Apart from the factor loadings criterion, Kaiser criterion of retaining only dimensions with eigenvalues greater or equivalent to 1 were retained. in essence Kaiser criterion elaborates that a factor explains at least as much variance as the equivalent of one variable, otherwise it should be left out (Antonelli and Taurino, 2009). Summary of the dimensions is given as follows.

Indicators under dimension 1 that had a loading of 0.4 and above constituted the following, namely; good agricultural practices (GAP) are in place (0.952); gaps audits are regularly conducted (0.952); product guarantee is given to importers, retailers or ultimate consumers (0.752) we engage our suppliers through production and sales contracts (-0.427); we promote joint management decisions with our partners (0.952); we promote interdepartmental meetings with our different departments & units (0.953) and we have an ‘open door’ policy to our stakeholders (0.732). Upon review of the indicators listed, dimension 1 was relabeled as *standards and certifications* in line with the with involvement of the horticultural exporters in strict GAP practices and facilitative means to the same as elaborated in the type of guarantee(s) given to various actors in the chain, promotion of a all-inclusive contract management through production and sales and the consultative decision making that is paramount in sustaining quality standards along the value chain.

Dimension 2 constituted of fourteen indicators, namely business ownership (-0.607); countries of export Categorized (-0.511); direct orders from European Retail (0.467); selling through Middle Merchants (-0.475); Use of export Processing Village(s) (-0.472); Conducted Mock recall (0.406); Importer engagement through production & Sales contract (0.415); Supplier engagement through Production & Sales Contract (0.480); We have a strong internal information Sharing mechanism (0.530);

we emphasis close supplier contact (0.554) We share our supplier forecast with customers (0.559); We establish close customer contact (0.560) We collaborate with Regulators (0.518), and we emphasis openness (0.985) in our relations. Dimension 2 was relabeled as *nature of transactions* with emphasis relating to the way exporting is conducted for various countries in terms of either homogenous export demands in standard requirements by market blocks such as EU and as well as the heterogeneity of multiple markets with varied demands in export of horticultural products; resultant to the varied demands by exporters, exporters' relations with their upstream and downstream actors are commensurately affected in response to the unique transactions of either the homogeneous or heterogenous transactions. This dimension also related strongly preference of production and sales type contracts as ideal means of safeguarding to the exporters production as well as the control of sales, as such the contracted suppliers would not be open to transact with other exporters or market channels other than the one stipulated in terms, in equal measure the suppliers of the produce would not suffer as a consequence of low yield or quality and hence the use of production and sales contracts seems more plausible and inclusive to both contracting parties.

Dimension 3 tapped on the following statements, namely; We establish close supplier contact (-0.508); we share our supplier forecast with customers (-0.505); we establish close customer contact (-0.502); decision making is communicated to our suppliers & customers (0.809); we emphasis openness (0.787); we have strong corporate relations (0.621) and we have quality monitoring in our systems (0.807). This dimension was relabeled as *level of value chain integration*. This dimension was related to integration largely due to the link between close supplier and customer contacts shared through joint forecasting, synergized communication, quality monitoring and enhanced openness and corporate relations.

Table II: CATPCA and Reliability on Joint Value Chain Governance Determinants

Indicators	Dimension				
	1	2	3	4	5
Business Ownership	-0.143	-0.607	-0.078	0.136	-0.006
Countries of Export Categorized	-0.067	-0.511	0.084	0.166	0.483
Frequency of Exports	0.082	0.207	0.111	0.022	-0.330
Sale by Excl. Agreements with Importers	-0.212	-0.013	0.175	-0.030	-0.070
Marketing through Direct orders to Retailers	0.047	0.467	0.280	-0.350	0.136
Selling through Middle merchants	-0.368	-0.475	-0.093	0.221	-0.104
Marketing through Export Processing Villages	-0.123	-0.472	0.217	0.305	-0.162
Good Agricultural Practices	0.952	-0.332	0.136	0.004	-0.052
Conducted Gaps audits	0.952	-0.331	0.136	0.004	-0.052
Codification of Standards	-0.243	-0.362	-0.236	0.283	0.219
Documented Procedure for recall	0.015	0.186	0.382	0.050	-0.103
Conducted Mock recall	0.162	0.406	0.106	-0.218	0.069
Give guarantee to Importers, Retailers and consumers	0.523	-0.107	0.108	-0.029	-0.372
Import Oral Contract	0.018	-0.098	0.018	0.209	0.484
Import Sales Contract	0.098	-0.128	0.018	0.242	0.542
Import Production & Sales	0.062	0.415	-0.118	-0.035	-0.666
Supplier Oral Contract	-0.011	-0.145	-0.011	0.225	0.492
Supplier Sales Contract	0.105	-0.227	-0.180	0.243	0.464
Supplier Production & Sales	0.049	0.480	0.111	0.102	-0.551
Brokers engagement	-0.427	-0.269	0.268	0.415	-0.407
Broker contract on Oral Contract	-0.102	-0.328	0.044	0.636	-0.353
Broker contract on Sales Contract	-0.369	-0.062	0.035	0.593	-0.425
Brokers contracts on Production & Sales	-0.075	-0.204	0.162	0.560	-0.405
Internal information Sharing	0.181	0.530	-0.331	0.119	0.138
Joint Management decisions	0.952	-0.332	0.135	0.004	-0.052
Interdepartmental Meetings	0.953	-0.329	0.134	0.003	-0.050
Open Door Policy	0.732	-0.220	0.074	0.016	-0.153
Close Supplier Contact	0.257	0.554	-0.508	0.538	0.106
Feedback to Suppliers Shared	0.861	0.163	-0.266	0.380	0.040
Customer Supplier Forecast	0.257	0.559	-0.505	0.535	0.110
Supplier in quality inspection	0.952	-0.327	0.137	-0.002	-0.050
Close Customer Contact	0.254	0.560	-0.502	0.545	0.096
Decision making communicated to suppliers & Customers	0.015	0.366	0.809	0.280	0.206
Regulator's Collaboration	0.370	0.518	0.099	-0.150	-0.044
Emphasis on Openness	0.033	0.433	0.787	0.279	0.218
Corporate Relations	0.047	0.286	0.621	0.288	0.208
Quality Monitoring	0.016	0.368	0.807	0.279	0.212
Quality Control Coordination	0.501	0.288	-0.224	-0.073	-0.015
Dimension Extracted				Variance Accounted For	

	Cronbach's Alpha	Total (Eigenvalue)
1. Standards & Certifications	0.888	7.381
2. Nature of Transactions	0.827	5.131
3. Level of value Chain Integration	0.770	3.990
4. External Contingencies	0.714	3.284
5. Nature of Contract	0.710	3.242
Total	0.982 ^a	23.028

a. Total Cronbach's Alpha is based on the total Eigenvalue.

Dimension 4 constituted of fourteen indicators, namely we have brokers engagement (0.415); we engage brokers through oral contracts (0.636); we engage brokers through sales contracts (0.593); We engage brokers through production & sales contracts (0.560); we establish close customer contact (0.538); decision making is communicated to our suppliers & customers (0.535), and we emphasis openness (0.545). Dimension 4 was relabeled as *external contingencies* largely due to two factors namely, Due to the short product life cycle of fresh fruits and vegetable exports and contingency reasons; it makes it easy for exporter to work with brokers with the sector's experience as a reliable alternative especially in filling in the short falls of the ordered quantities or for defraying costs associated in buffer/cautionary stocks. While the dependency of brokers is evident their engagement is largely considered adversarial and mostly relied upon for contingency and short-term motives other than long-term collaborative efforts; while the exigency reasons for engaging brokers hold true, exporters stand the risk of associated reliance to the brokers especially if products are compromised in terms of the stringent standards and hence making them loose key customer accounts.

Dimension 5 constituted of contract related indicators on, countries of export categorized (0.483); exporters engagement with importers through oral contracts (0.484), sales contract (0.542), and Production & Sales contracts (-0.666); exporters engagement with suppliers through oral contracts (0.492), sales contracts (0.464) and production & Sales contracts (-0.551); exporters engagement with

brokers engagement (-0.407); is firmed up through sales contracts (-0.425) and through production & sales contracts (-0.405). Dimension 5 was relabeled as *nature of contracts* largely due to two conditions related to exporter engagement with downstream actors represented by demands associated with heterogenous export destinations coupled with the unique requirements by their importers and upstream actors demands related to contracted horticultural farmers and or their agencies. Depending on the level of engagement and collaborations, contracts are in this sector operationalized as oral contracts to largely trust driven firms and either production & sales or sales contracts to adversarial or short term transactions type of engagements.

Overall and as per table II the five dimensional CATPCA components/dimensions/factors were interpreted in this study as Standards & certifications, nature of transactions, Level of supply chain integration, External contingencies and Nature of contracts. The extracted dimensions realized eigenvalues greater than one with sufficient reliability; the total Cronbach alpha for all the dimensions was 0.982 with a total eigenvalue of 23.028; each of the extracted dimensions had a Cronbach alpha of 0.888, 0.827, 0.770, 0.714 and 0.710 respectively with a variance accounted for by each of the dimensions being 7.381, 5.131, 3.990, 3.284 and 3.242 for each of the extracted dimensions respectively.

The combined effect of the of the determinants to competitiveness through innovation was determined by multiple regression analysis. The determinants were considered as independent variables as standards and certifications, nature of transactions, value chain integration, external contingencies and nature of contract which were analysed to determine their effect to the dependent variable of competitiveness in innovation; the findings are reported below.

The hypotheses were tested by using multiple regression analysis. First, each of the H1 through H4 concerning the influence of the value chain governance determinants on the competitiveness

through innovation outcomes were tested using multiple regression analysis. Each of the antecedent variables was first regressed on to each performance outcome in a standard linear expression ($Y = b_0 + b_1 X$).

Table III shows the results of the hypotheses testing. The left-hand portion of the table illustrates the direct effects of value chain governance determinants on the competitiveness through innovation.

Table III: Results of Multiple Regressions

Direct Effect	Product Innovation β	Process Innovation β	Marketing Innovation β	Organization Innovation β
<i>Nature of Transaction</i>	-0.034**	0.007	0.071	-0.010
<i>Nature of Contract</i>	-0.005**	-0.14**	-0.107**	0.007
<i>Supply Chain Integration</i>	0.014**	0.028	0.086	0.003
<i>Standards & Certification</i>	0.099**	0.085*	0.096**	0.093
<i>External Contingencies</i>	0.000	-0.046	-0.130	-0.014
F	916.28**	2.671**	3.139**	1.514
R ²	0.983	0.148	0.169	0.09

Notes * $p < 0.10$; ** $p < 0.05$

The results indicate that nature of transactions, nature of contract, supply chain integration and standards & certifications had a direct effect on product innovation; however the impact of nature of transactions and nature of contract to product innovation was noted to be negative ($\beta = -0.034$; $p < 0.001$) and ($\beta = -0.005$; $p < 0.001$) respectively. Largely, nature of contract had negative effect on product innovation ($\beta = -0.005$; $p < 0.001$), process innovation ($\beta = -0.14$; $p < 0.004$) and marketing innovations ($\beta = -0.107$; $p < 0.023$). Standards & Certification emerged as strong instrument impacting on product innovation ($\beta = 0.099$; $p < 0.001$), process innovation ($\beta = 0.085$; $p < 0.07$) and marketing innovations ($\beta = 0.096$; $p < 0.037$).

Conclusion

This study feeds into the continuing GVC studies and exploration of how changes in organisations and coordination of global trade and production characterised by the fragmentation of production processes between countries has taken form, as well as impacted the general international political economy; particular to this study is the toll in which the integration of the developing and the developed economies or the global North and South relations through fragmented production has affected the sectors governance terrain. This research first confirms five determinants namely standards and certifications, nature of transactions, level of supply chain integration, nature of contract and external contingencies as critical to export driven horticultural value chains. The study as well affirms and corroborates albeit statistically the centrality of these determinants in order to promote competitiveness of developing economies in their trade with developed economies. Novel to this research remains the critical role of standards and certifications as governance tool as well as a strategic instrument of competition in differentiated markets that has largely realigned the nature of transactions in horticultural GVCs. Overall, standards and certification schemes have a forceful impact on the management and administrative mechanisms of value chains and their structures; as in the case of Kenya's horticultural export sector the said standards have availed upgrading opportunities for producers. The rise of food standards in export value chains and the demand for consistent high volumes and good quality produce has as well increased the need for contingency planning; as an emerging phenomena horticultural sector producers are increasingly realigning the traditional GVC structures to currently favouring hybrid governance structures with greater flexibilities and expediency that is sync with the constraints related to short-product life cycle of fresh fruits and vegetable exports and changing customer demands.

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