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## China's Move up the Value Chain. A Framework for Analysis\*

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*La escalada de China en la cadena de valor. Marco de análisis  
O movimento ascendente da China na cadeia de valor. Uma Base para Análise*

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*This paper analyzes China's efforts to move up the value chain with a new theoretical framework that looks at both supply- and demand-side factors. While China can impact its productive capabilities directly through government policy and firm investment, market conditions and value chain relations are not so amenable. China's latecomer status puts it at a disadvantage in forming its own international value chains. However, its fast-growing domestic market affords China a unique opportunity to cultivate its own value chain and competitiveness based on familiarity with consumer preferences and demands at home.*

*Este documento analiza los esfuerzos de China para escalar en la cadena de valor con un nuevo marco teórico que analiza factores tanto desde el punto de vista de la oferta como de la demanda. Mientras que China puede afectar sus capacidades productivas directamente a través de la política gubernamental y de la inversión empresarial, las condiciones del mercado y las relaciones de la cadena de valor no son tan flexibles. El hecho de que China sea la "nueva incorporación" la sitúa en desventaja en cuanto a la formación de sus propias cadenas de valor internacionales. Sin embargo, su mercado interior de rápido crecimiento brinda a China una oportunidad única para cultivar su propia cadena de valor y competitividad en base al conocimiento de las preferencias y de las demandas de los consumidores en el país.*

*Este estudo analisa os esforços da China para subir na cadeia de valor, com uma nova base teórica que assenta em factores do lado do fornecimento e também da procura. Embora a China possa causar impacto directamente nas suas capacidades de produção, através de políticas governamentais e do investimento das empresas, as condições de mercado e as relações da cadeia de valor não são as mais adequadas. O estatuto de último a chegar da China coloca-a em desvantagem para formar as suas próprias cadeias de valor internacionais. Contudo, o seu mercado doméstico em rápido crescimento proporciona à China uma oportunidade única para cultivar a sua própria cadeia de valor e competitividade com base na familiaridade com as preferências dos consumidores e da procura doméstica.*

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## 1. Introduction

China's emergence as a global economic power has led to a realignment of global economic forces and relations. Within a period of 20 years, China has become the largest exporter and the second largest economy in the world. The rising volume of exports from China has transformed international trade and corporate value chains in a fundamental manner. However, until recent years, much of China's exporting has been characterized by goods at the lower end of the international value chain, with relatively few technological inputs from domestic Chinese firms. Not surprisingly, despite their burgeoning volumes since the early 1980s, profit margins for Chinese exports have remained relatively low. While such inferior profit margins are commensurate with China's position in the international value chain, they nevertheless represent a barrier to China maximizing its gains from trade and future economic development. Consequently, recent improvement in China's technological capability has engendered a strong desire to move up the value chain and reduce its reliance on the manufacturing of commoditized manufactured goods and the assembly of high technology products for multinational enterprises (Soderman, Jakobsson and Soler, 2008).

Indeed, a move up the value chain through innovations is now viewed as a crucial strategy to increase China's gain from trade and its long-term competitiveness. This strategy is consistent with the general thesis that upgrading the value chain of an economy by producing better products, increasing business efficiency, and entering into more skill-intensive industries is a necessary and important strategy for increasing an economy's global competitiveness (Porter, 1990). Accordingly, efforts to encourage higher value added activities and industrial innovations have become central to China's economic strategies, as seen in key policy documents such as the last two National Five-year Plans, promulgated in 2006 (Sleigh and Von Lewinski, 2006), and 2011<sup>1</sup> (Xinhuanet, 2011), as well as various industrial policies aimed at increasing R&D expenditures in China through local contents, mandatory joint venture, and technology transfer legislations (Hout and Ghemawat, 2010, p.97).

In addition to national development policy, the impetus for Chinese firms to move up the value chain is found in the evolution of market forces. Recent appreciation in the Chinese currency (RMB) and increases in labor costs, along with greater technological competency and market experience, have set into motions economic forces that compel Chinese firms to move up the value chain as their cost competitiveness erodes (Financial Times, 2006). Specifically, higher wages and a rising RMB will ineluctably diminish China's competitiveness in traditional labor-intensive manufactured goods, thereby encouraging its firms to switch to more sophisticated goods with higher technology contents and profit margins. An appreciating RMB will also reduce the cost of imported technology and intermediate goods, thereby easing the capital cost of moving up the value chain. How this trend plays out will have implications for the position of Chinese firms in the global economy as well as the continued economic development of China.

1. The 11<sup>th</sup> Five-Year Plan calls for the building of competitive advantages based on science, technology, and innovation, raising the R&D-to-GDP ratio from about 1.3% in 2005 to 2.5% by 2020. The 12<sup>th</sup> Five-Year Plan calls for a target R&D-to-GDP ratio of 2.2% and 3.3 patents per 10,000 people.

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The aim of this paper is to provide a framework for analyzing and assessing China's strategy to upgrade its value chain. While much has been written about the factors underlying China's attempt to upgrade its value chain, both favorable and unfavorable, this paper will put these factors in a consistent framework for better understanding and analysis. Specifically, factors pertaining to China's attempt to move up the value chain will be classified as either supply-side or demand-side determinants in an effort to analyze the interplay between market relations, technical issues, and government policies. The results of our analysis also have implications for Latin America as it increases its participation in the global value chain.

## 2. Recent Developments in China's Value Chain<sup>2</sup>

Notwithstanding China's emergence as the factory of the world in relatively short order (Wilson and Purushothaman, 2003), a move up the value chain will present some novel challenges to Chinese firms. Until recent years, low cost, standardized, and commoditized products characterized China's growing exports. China's export strategy was one of cost leadership (Midler, 2009). Most Chinese exporters competed on the basis of price and did not differentiate their products in terms of "form, features, performance quality, conformance quality, durability, reliability, reparability and style" (Kotler and Keller, 2006). These factors are of crucial importance further up the value chain, so a departure from this approach is necessary if China was to upgrade its position. Chinese exporters must adapt and acquire the requisite technical and marketing skills if they are to compete successfully up the value chain.

In general, moving up the value chain can take one of two forms. Chinese firms can attempt to capture greater production value by either (1) producing more sophisticated goods or performing functions higher in the value chain, or (2) expanding into new products and market spaces where the value added and profit margins are greater. It appears that China has begun to do both in recent years. This nascent move up the international value chain is seen in recent changes in China's production mix as reflected in its export composition. Specifically, many point to the rising significance of machinery, intermediate goods, and telecommunications equipment in China's exports as an indicator of its movement up the value chain (Cui and Syed, 2007). This trend is seen in [Table 1](#), where primary exports as a percentage of China's total exports have declined from 50% to a mere 5% between 1980 and 2008. The emerging prominence of manufactured exports is also accompanied by a decline in light textiles exports as a percentage of total manufactured exports, from 44% to 19%, and a rise in intermediate goods such as machinery and transport equipment, from a miniscule 9% to 50%. To the extent that production of machinery and transport equipment requires more technological and process skills than that of textiles, a movement up the value chain can be said to have occurred in China since the late 1990's.

2. Discussions in this section are intended only to provide a background rather a thorough review of China's trade structure.

Table One: Compositions of China's Exports, 1980 - 2008 (100 million RMB)

Year	Total	Primary	Manufactured	Components of Manufactured Exports		
				Chemicals	Light textiles	Machine and transport equipment
1980	181.19	50%	50%	12%	44%	9%
1985	273.50	51%	49%	10%	33%	6%
1990	620.91	26%	74%	8%	27%	12%
1995	1487.80	14%	86%	7%	25%	25%
1996	1510.48	15%	85%	7%	22%	27%
1997	1827.92	13%	87%	6%	22%	28%
1998	1837.09	11%	89%	6%	20%	31%
1999	1949.31	10%	90%	6%	19%	34%
2000	2492.03	10%	90%	5%	19%	37%
2001	2660.98	10%	90%	6%	18%	40%
2002	3255.96	9%	91%	5%	18%	43%
2003	4382.28	8%	92%	5%	17%	47%
2004	5933.26	7%	93%	5%	18%	49%
2005	7619.53	6%	94%	5%	18%	49%
2006	9689.36	5%	95%	5%	19%	50%
2007	12177.76	5%	95%	5%	19%	50%
2008	14306.93	5%	95%	6%	19%	50%

Source: China Statistical Yearbook, 2005, 2006, and 2009.

One consequence of China's move up the value chain has been its manufacturing trade surpluses with the US and EU. Indeed, China is now the largest exporter of manufactured goods to the US, and the EU is China's largest manufacturing export market since 2008. Growth in the machinery and transport sectors has consistently outpaced other export categories during the past five years. An important element of China's trade surplus with the US has been its rising exports of Advanced Technology Products (ATP) to the US. By one estimate, the US' "ATP deficits with China account for more than the total US losses and are also larger than the total global surplus in Intellectual Property royalties and fees of all US-incorporated firms. ...The number of distinct ATP in which US-based producers enjoy a surplus with China declined from 287 in 2001 to 225 in 2008; the number of Chinese-produced ATP with surpluses increased from 312 in 2001 to 328 in 2008" (Cui and Syed, 2007). Leading this growth in China's ATP exports is its leading telecommunications equipment maker Huawei Technologies Co. Ltd. (hereafter Huawei). This company has developed an international presence and has seen its foreign contracts increase from \$244 million in 2001 to \$4.8 billion in 2008. Today, Huawei has 37,000 employees in 40 countries, 18,000 of whom are involved in R&D (Miller, 2006b). More importantly, Huawei is the recipient of the 2010 Corporate Use of Innovation Award from *The Economist* (*Financial Express*, 2010), attesting to the rising sophistication and competitiveness of Chinese firms in the telecommunications sector. However, notwithstanding the growing competitiveness of Chinese high technology firms, much of the exports of technology goods from China have remained the domain of foreign companies,

who account for 85 percent of China's high technology exports and the bulk of its high technology production in 2008 (Hout and Ghemawat .P.97).

At home, China's move up the value chain is seen in the greater production of intermediate input and upgrading of existing product lines. Examples of such movements include production of higher value textile products such as synthetic fibre operating rate, polyester staple fibre (PSF), and textile chemicals<sup>3</sup>; industrial machinery and equipment; marine and shipping equipment; transport equipment and automobiles; and consumer appliances. This movement toward more sophisticated products has seen Haier, a major white goods producer, and various motorcycle producers in China capturing an increasing share of the world market as well. Concomitant to an upgrade of existing product lines, Chinese firms have also entered into new areas of production such as aircrafts, high speed rails, aerospace equipment, pharmaceutical products, etc. While many of these sophisticated products are currently produced only for the domestic market, they are indicative of China's ambitions for a leading position in the global value chain.

### 3. Value Chain Upgrade as a Development Policy

Despite many improvements in its technological capabilities, China must do more to escape the role of a low margin producer in the global economy. China must overcome the technological gap with foreign producers if it is to become a producer of high technology products. Such a gap exists even in areas that China has aggressively pursued at home, such as aviation, computer software, wind energy, and rail technologies (Hout and Ghemawat. p.98). To move up the value chain, fostering domestic innovation has been and will remain a key policy goal of the Chinese government. The recent re-statement of a target R&D-to-GDP ratio of 2.2 percent in China's 12th Five-Year Plan is simply a continuation of its innovations policy over the past decade. China's aggressive promotion and support for R&D activities through various channels such as government-sponsored science parks, university and corporate research, and foreign direct investment programs have led to a burst of R&D spending in China.

3. ICB (2009) "China textile chemicals move up the value chain: the long march", August 24, 2009.

Table 2: China's R &amp; D Expenditures and Activities, 2004 – 2008

	2004	2005	2006	2007	2008
<b>Full-time Equivalent of R&amp;D Personnel</b>	115.3	136.5	150.2	173.6	196.5
(10,000 Man-year)		(18.41%)*	(10.05%)	(15.58%)	(13.21%)
<b>Funding for S&amp;T Activities</b>	4328.3	5250.8	6196.7	7695.2	9123.8
(100million RMB)		(21.31%)	(18.01%)	(24.18%)	(18.56%)
<b>Expenditure on R&amp;D</b>	1966.3	2450	3003.1	3710.2	4616
(100 million RMB)		(24.60%)	(22.58%)	(23.55%)	(24.41%)
<b>R &amp; D Expenditure as % of GDP</b>	1.23	1.33	1.42	1.44	1.54
<b># of Patents Application Accepted (piece)</b>	353807	476264	573178	693917	828328
		(34.61%)	(20.35%)	(21.06%)	(19.37%)
<b># of Patents Application Granted (piece)</b>	190238	214003	268002	351782	411982
		(12.49%)	(25.23%)	(31.26%)	(17.11%)

Note: \* indicates annual rates of growth.

Source: China Statistical Yearbook 2005 and 2009.

An overview of China's R&D expenditures and activities is given in Table 2. The upward trend in R&D expenditure and activities in China is beyond doubt, but it is the quality of such activities that has been the subject of scrutiny among scholars and observers. Whether the patent applications in China are an appropriate indicator of China's rising technological prowess is open to dispute. International patent applications are generally accepted as a more accurate measure of a country's R&D outputs<sup>4</sup>. When PCT (Patent Cooperation Treaty) applications are used as an indicator, China is ranked among the top five nations in the world, as illustrated in Table 3.

4. A more exacting benchmark would be patents associated with market-ready or commercially applicable technology.

Table 3: PCT international applications – Top 15 countries

RANKING	COUNTRY	2006	2007	2008	2009	2010 ESTIMATE	2010 PERCENT	2010 GROWTH
1	United States of America	51,280	54,043	51,637	45,618	44,855	27.5%	-1.7%
2	Japan	27,025	27,743	28,760	29,802	32,156	19.7%	7.9%
3	Germany	16,736	17,821	18,855	16,797	17,171	10.5%	2.2%
4	China	3,942	5,455	6,120	7,900	12,337	7.6%	56.2%
5	Republic of Korea	5,945	7,064	7,899	8,035	9,686	5.9%	20.5%
6	France	6,256	6,560	7,072	7,237	7,193	4.4%	-0.6%
7	United Kingdom	5,097	5,542	5,466	5,044	4,857	3.0%	-3.7%
8	Netherlands	4,553	4,433	4,363	4,462	4,097	2.5%	-8.2%
9	Switzerland	3,621	3,833	3,799	3,671	3,611	2.2%	-1.6%
10	Sweden	3,336	3,655	4,137	3,567	3,152	1.9%	-11.6%
11	Canada	2,575	2,879	2,976	2,527	2,707	1.7%	7.1%
12	Italy	2,698	2,946	2,883	2,652	2,632	1.6%	-0.8%
13	Finland	1,846	2,009	2,214	2,123	2,076	1.3%	-2.2%
14	Australia	1,996	2,052	1,938	1,740	1,736	1.1%	-0.2%
15	Spain	1,204	1,297	1,390	1,564	1,725	1.1%	10.3%
	All Others	11,531	12,595	13,725	12,659	12,909	7.9%	2.0%
	Total	149,641	159,927	163,234	155,398	162,900		

Source: WIPO News and Events, World Intellectual Properties Organization, 2011.

This emergence of China's status as an R&D contender is the result of a decade of double-digit growth in its R&D spending, as indicated in Table 2. However, in absolute amounts, China's R&D spending has remained only a fraction of the level observed in most developed nations. It is thus reasonable to conclude that, despite China's aggressive support for R&D activities, it will be some time before it can assert dominance as a technological powerhouse.

While some evidence of initial success is reported, there remains much concern with China's capability to do become a producer and exporter of high technology products. Given China's production capability and factor endowment, it is generally accepted that further development of suitable human resources, technological know-how, management expertise skills, and other innovative skills is required for China to move up the value chain. The current supplies of such ingredients in China are considered inadequate by many for a rapid transformation and upgrade of China's value chain position. Indeed, these are the same essential determinants of an economy's long-term competitiveness identified in the literature



on 'new economic geography', business studies, regional science, and innovative studies (Humphrey and Schmitz, 2002). China must continue to develop these factors as it continues on its development path. Not surprisingly, government policies in China have actively focused on the cultivation of these factors both as a matter of developmental policy and as support for Chinese firms to augment their competitiveness and move up the value chain<sup>5</sup>.

#### 4. Constraint of Value Chain Relations

As a matter of economic reality, government policies have been important in shaping economic and industrial development in China since the economic reform in 1978. The "Go Global" policy inaugurated after China's entry into the WTO in 2001 has been instrumental in furthering economic openness, and is responsible for the impressive growth of the Chinese economy. To build on this economic momentum, China has implemented a host of policies since 2005 designed to promote greater globalization and competitiveness of its firms<sup>6</sup>. They include construction of new infrastructural facilities in transport and communications, promotion of science and innovations through technology parks and the 10 Industry Revitalization Plan, financial support and tax incentives for high-tech enterprises, establishment of new domestic standards for goods and technology<sup>7</sup>, greater direct foreign investment abroad, and entry into new product markets. The aims of these policies are to maximize value-added production and advance China's technological capability.

While the aforementioned policy initiatives are undoubtedly essential prerequisites to China's move up the value chain, many determinants of value chain relations are beyond the direct influence of Chinese government policies. These include international demand factors, sourcing and supply chain strategies of multinationals, international distribution systems, and competitive market conditions. China's move up the value chain will be affected by these fundamentals of market forces and global value chain relations as much as by the force of government policies. One must recognize the realities and constraints of value chain relations in studying China's ambition of moving up the value chain.

By focusing on value chain coordination, Humphrey and Schmitz (2002) have identified a continuum of value chain relations we could adapt to our analysis. The continuum ranges from vertical integration at one end to a total arm's length relationship at the other. In between lie networks value chain, where member firms are characterized by complementary competencies and skills; and quasi-hierarchy, where a powerful partner, usually an international buyer, dominates the value chain. While a networks value chain typically denotes horizontal (or non-dominant) production relations among suppliers of a given product, a quasi-hierarchy

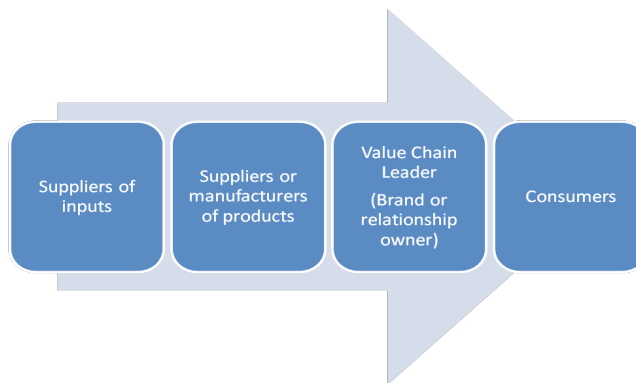
5. The role of government in promoting economic growth is seen in the study of regional economics in enhancing agglomeration economies and human resource development (Scott 1996 & Edquist 1997).

6. See Schmittzehe & Partners (2009).

7. For example, China has moved to adopt TD-SCDMA for its domestic wireless mobile 3G standard as a way to develop the domestic telecommunications industry (Economist 2010).

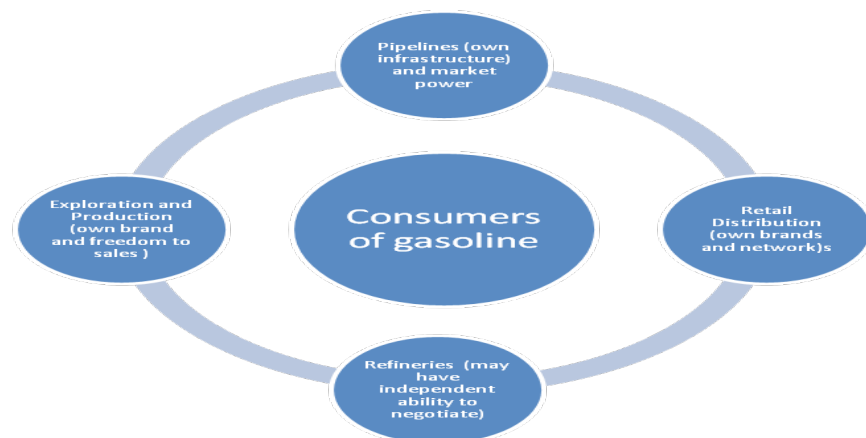
is defined by the asymmetrical power existing between local producers and international buyers. Examples of quasi-hierarchy include large global retail chains such as Walmart, who enjoys tremendous power in its value chain, and the global computer industry, where U.S. companies play the leading role at the top of the value chain with Taiwanese ODMs and OEMs in the middle and mainland Chinese manufacturers at the bottom. A hypothetical quasi-hierarchy is illustrated in Figure 1. The most important aspect of this figure is seen in the value chain leader's ownership of a brand that is recognized by consumers, which allows it to "own" and cultivate the relationship with the consumers.

Figure 1: A Hypothetical Hierarchical Value Chain



A network value chain, on the other hand, consists of producers who interact with each other and work together to co-produce values for a particular industry. They represent different nodes in the value chain network but each enjoy their own market power and brand equity in the market. Members of the network value chain work in a complementary fashion to meet the needs of the final consumer. An example of a network value chain is the petroleum industry, which works to meet consumer demands for gasoline as a final product. A network value chain is shown in Figure 2.

Figure 2: The Petroleum Industry as a Network value Chain



In today's global market, the boundary or distinction between a hierarchical and network value chain is not always permanent. Network value chains can evolve into quasi-hierarchies through mergers and acquisitions by dominant firms who aim to gain control of the value chain for their own interests.

It is important to know a firm's role in a value chain if we are to understand how it may go about changing its position and whether such change is likely to succeed. How firms relate to each other in the value chain will not only determine how their value chain positions may evolve over time, but also predict the likely outcomes of any disruptions to the existing value chain. For instance, it would be more difficult for a firm in a quasi-hierarchy than for a firm within a network value chain to move up the value chain unilaterally by producing a more sophisticated product or adapting its product for a different target market. This is because such a move is likely to invite resistance from the value chain leader, who may not welcome the new competition this would bring. On the other hand, the value chain leader of a quasi-hierarchy may encourage or even facilitate a firm's move up the value chain if it is required for its own strategic interest, such as changing its own product mix or improving product quality, for example. In the latter case, a lead firm in the value chain who wants to switch to more sophisticated products or expand their product offerings would actively assist a Chinese firm to move up the value chain through acquisition of new skills and capabilities.

This means a unilateral attempt by firms within a quasi-hierarchy to move up the value chain without client cooperation may engender barriers and resistance that would make such a move difficult. They must be prepared to overcome various market barriers and competitive responses from existing producer or lead firms up the value chain. After all, international lead firms or leaders up the value chain can be expected to react to new market entrants and competition adversely. The ability of Chinese firms to compete with international firms further up the value chain will thus be a crucial success factor in upgrading their position in the global value chain. As we will discuss subsequently, most international value chains are dominated by multinational firms who enjoy significant advantages in areas such as international brand equity, management and marketing expertise, design capability, and ownership of existing distribution channels. Overcoming these advantages will not be an easy task for Chinese firms aspiring to a similar position in the global value chain.

Within the macro environment created by government policy and value chain relations, the question of value chain upgrade can also be approached from the firm's micro perspective. In general, there are four types of value chain upgrades a firm may wish to pursue<sup>8</sup>. They are: (1) process upgrading through better technology or more efficient production systems; (2) product upgrading via movement into more sophisticated product lines (up the supply chain); (3) functional upgrading by acquiring new functions or increasing the skill level of activities; and (4) inter-sector upgrading through movements into new activities. Not all of these upgrading categories offer the same technical and economic challenges. For example, process and product upgrading are underscored by technical considerations that are more directly subject to a firm's control and influence than functional and inter-sectoral upgrading. A firm can be expected to exert greater influence on the outcomes of process and product upgrading as they are immediately related to a firm's efficiency and competitiveness. The barriers to upgrading presented by value chain relations are not immediately apparent and

8. These categories are adapted from Humphrey and Schmitz (2002).

threatening. Consequently, process and product upgrading is where one would expect China to experience and demonstrate the most success in moving up the value chain. The requirements of the different types of upgrade for new technology, process, and market access, as well as the degree of control a firm may exert over the upgrade, are presented in Table 4.

Table 4: Comparative Views of value Chain Upgrade

Type of Upgrade	New Technology Required?	New Process Required?	New Market Necessary?	Degree of Firm Control
Process	Yes	Yes	No	Great
Product	Yes	Yes	No/Maybe	Great
Functional	Yes	Yes	Yes	Small
Inter sectoral	Yes	Yes	Yes	Small

However, China's objective of value chain upgrade calls for more than just process and product upgrading. Functional and inter-sectoral upgrading are important elements of this objective. Production of high technology products and entry into markets for these products are considered essential to creating a modern Chinese economy. This means China's attempt to move up the value chain in high technology products is constrained by macro factors such as value chain relations and market forces beyond the firm's immediate control. A synthesis of the aforementioned factors is attempted in the next section in order to assess the prospects of China's value chain upgrade strategy.

## 5. A Framework for Analysis

Complex supply chain relations and organizations underlie today's value chains. They are intended to compete with other value chains with maximum efficiency across the entire value chain. Modern value chain relations are fashioned to achieve a high level of efficiency and consumer responsiveness. Cooperation and collaboration throughout the value chain are essential to the efficacy and viability of such chains. This means any attempt by a value chain member to modify or terminate its role in the value chain will cause a disruption in fundamental value chain relations if not coordinated with value chain partners. The potential benefits accruing to a chain member from a disruption of existing value chain relations must be balanced against their costs. Successful movements up the value chain are dependent on more than improvements in production capability and supportive government policies. Market demand, product distribution, and consumer acceptance are the other side of the proverbial coin.

If improvement in productive capacity, product innovations, and enabling government policy are the supply-side factors, consumer preferences and market conditions are then the

demand-side factors in the fashioning of a successful value chain. Lead firms in any value chain are usually those who have proven their skills in reconciling supply- and demand-side considerations in satisfying the needs of a particular market demand or consumer segment. A successful value chain is more than a supply chain that produces goods at a competitive cost, but one that delivers these goods with the design, quality, distribution channels, and after-sale service required by the consumers. As the product line becomes more sophisticated, product customization and differentiation will become increasingly important in maintaining its market competitiveness. A successful value chain is one in which the forces of production are organized in an effective and competitive manner to meet the needs of the market. The high margin value chain activities such as marketing, brand development, product design, and customer service will increase in significance as a firm moves up the value chain. Unfortunately, expertise in these high margin activities is generally lacking in many developing countries. Suppliers in these countries may also find it difficult to enter foreign consumer markets without the requisite cultural and market familiarity, should they decide to create their own value chain. This accounts for why most international value chains are quasi-hierarchies led by multinationals from Western countries.

For China to successfully move up the value chain, it must therefore overcome constraints on both the supply and demand sides. Our analytical framework is thus built on the interplay of supply and demand factors.

### 5.1. Supply-Side Elements

A necessary, though not sufficient, condition for value chain upgrade is an improvement in China's productive capability. It must become more technology- and skill-intensive irrespective of the type of upgrading it aims to achieve. Indeed, all four types of value chain upgrade previously discussed have been identified as desirable for Chinese firms. These firms are encouraged to capture a greater share of production up the value chain, produce with better technologies and quality, and enter new industries and markets. Any strategy that would expand China's productive and technological capabilities would enhance its supply-side readiness for value chain upgrade. China's success in upgrading its value chain position will thus depend partially on its success in improving its productive resources.

Notwithstanding recent advances, China is said to suffer from a variety of deficiencies that will act as barriers to upgrading its value chain activities. As these deficiencies are widely discussed, it suffices to report that they include inadequate human resources and competency<sup>9</sup>, inefficacious management systems and capability, limited innovativeness, lack of cross-cultural and international expertise, poor international product image, etc. Not all critics are optimistic that China is equipped to overcome these weaknesses in short order. It is China's uneven business performance and lack of experience in activities further up the value chain that have caused many to express doubts about its attempt to move up the value chain. In particular, China's relative lack of professional skills in modern management, marketing, product design, and innovation is seen as a major barrier to its value chain upgrade efforts. The above deficiencies are nevertheless surmountable barriers for process and product

9. These would include technical, cultural, and linguistic skills.

upgrading and movements up the supply chain. Better technology and processes can be adopted to produce more sophisticated products to capture more value in the supply chain. Indeed, recent changes in China's trade structure have suggested significant improvements in these areas. However, it is these deficiencies' impact on functional and inter-sectoral upgrading that needs to be addressed. Consequently, recent government policies in China have enlarged its focus on enhancing its productive and innovative capabilities. Policies to encourage high technology investment and acquisition, scientific research, and human resource development are clearly intended to bolster China's supply-side ability to move up the value chain. China's records in industrial policy and economic development seem to augur well for its efforts to enhance its productive or supply-side capabilities.

However, improved productive capabilities and competency are not sufficient for a value chain upgrade. One must also recognize the dampening effect demand-side determinants may have on China's attempts to upgrade its value chain functions and compete in new global sectors or markets. Specifically, China's inability to influence consumer perception and create its own value chain is not correctable by domestic government policies. The absence of global brand recognition and China's reliance on multinationals for access to foreign markets are key barriers to Chinese firms altering their functions in the value chain or establishing their own value chains<sup>10</sup>. This suggests that China's prospects for process and product upgrading are much better than for functional and inter-sectoral upgrading.

## 5.2. Demand-Side Considerations

China's efforts to upgrade its value chain must go beyond the realm of productive capabilities to include market and demand-side considerations. Demand-side in the current context denotes not only consumer preferences and demands but also market conditions faced by Chinese firms in the global market. Specifically, market structure and value chain relations that would influence international demands for Chinese goods are also classified as part of the demand-side equation. China's ability to produce must be reconciled with international demands and market conditions in order to properly assess China's strategy of altering its value chain position.

While demand-side factors are relevant to all four types of value chain upgrade, our current discussion will focus on functional and inter-sectoral upgrades. These two types of upgrade would challenge and disrupt existing value chain relations and require a fundamental transformation of China's value chain capabilities. Specifically, both of these upgrade categories imply development of new product value chains that would require higher value chain functions such as product differentiation, design and innovations, brand development and marketing, and customer relations; these functions are not known to be strengths of Chinese firms. To succeed at functional and inter-sectoral upgrade, Chinese firms must become competitive with existing global value chain leaders with their own brands and distribution channels. They must build a high degree of consumer confidence and product image for the "made in China" label. Enhanced productive capability alone will not suffice. Chinese products must become accepted by foreign consumers as comparable to Western products in

10. See (Miller 2006).



terms of quality, reliability, service support, or exclusivity if Chinese firms are to compete at the higher end of the value chain or create their own value chains.

Functional and inter-sectoral upgrades are therefore most affected by the constraints of existing value chain relations and demand conditions. Will China be sufficiently competitive in these new markets? Will it be able to meet the requirements of new technical and value chain management skills? Will it be able to create the brand recognition and consumer acceptance necessary for success? Disruptions to existing value chain relations are also unavoidable as Chinese firms attempt to create their own value chains and compete with other existing value chains. What are the potential business costs engendered by such a strategy? What are the likely reactions of their current value chain partners? After all, insertion into international value chains led by foreign multinationals with existing markets and brand recognition has been responsible for China's export surge and subsequent economic growth. Instead of working within the existing quasi-hierarchies, can Chinese firms compete with their own value chains? This last question begs a discussion on China's relative competitiveness outside of its manufacturing prowess.

It is well known in economic literature that the international competitiveness of an economy is intimately linked to the income level and characteristics of the domestic economy. In addition to human, technological, and physical resource endowments, domestic consumption can also act as a powerful determinant of a country's economic competitiveness. From Linder's theory of demand similarity (Linder 1961) to Porter's competitive diamond (Porter 1990), the level and composition of domestic demand has been identified as a decisive determinant of a country's production structure and competitiveness. Countries tend to produce a high level of those goods that are commonly consumed by their populace, and build up a competitive advantage in these goods over time because of scale economies and innovations. They then become exporters of these goods, even to countries with similar resource endowments and technological backgrounds, because of product differentiation<sup>11</sup>.

The lifestyles and demands of domestic consumers are thus important determinants of how a value chain should be fashioned to access a given consumer market. Domestic firms that are familiar with the cultural nuances and consumer characteristics in their home markets clearly have an advantage over foreign firms in capturing domestic consumers for their products. Over time, a large domestic market for a product can transform these firms into global value chain leaders as their products move through the product lifecycle and production becomes internationalized. If this is how existing value chain leaders acquire their dominant positions in the quasi-hierarchies, the demand-side barriers to Chinese firms building their own value chain in competition with existing value chain leaders will be daunting<sup>12</sup>. This observation also serves to reinforce doubts about Chinese firms' capacity to market and develop their own brand names, and become competitive organizations in the global economy. Aside from manufacturing capability, China's move up the global value chain will also depend on its ability to overcome the cultural barriers and understand the psychic and lifestyle requirements of foreign consumers<sup>13</sup>. Failure to overcome these difficulties would manifest

11. The global wine market furnishes an excellent example in which French, Italian, American, and Australian wines are sold side-by-side in the domestic markets of different wine-producing nations.

12. It is generally believed that it is value chains rather than individual companies that compete with each other nowadays.

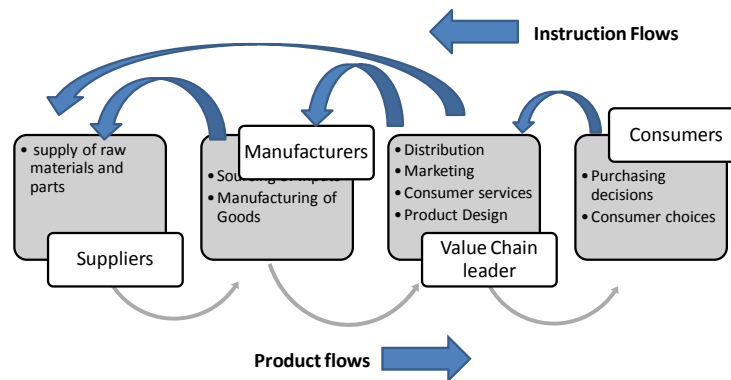
13. While China is the largest manufacturer of bicycles in the world, the recent installation of the public bicycle system in London utilizes bicycles manufactured in Canada, where a public bicycle system has been in use in Quebec for some time. This is an example of a lifestyle-generated innovation.

itself as failure to market effectively, design products with the features and quality demanded by foreign consumers, and supply requisite after-sale services.

### 5.3. Mediation of Supply and Demand through Value Chain Leadership

To successfully move up and compete at the higher end of the value chain, firms must be able to mediate between the supply and demand sides. The productive and creative capabilities of producers in the supply chain must be harnessed in a way that meets the requirements and needs of the consumers. Leadership of a value chain means the capacity to reconcile these two forces<sup>14</sup>. A conceptual representation of this process is presented in Figure 3, in which instructions to the value chain flow from the consumers to the leader, who then coordinates the supply chain and disseminates production instructions to other value chain members. Physical flows of inputs and goods go in the opposite direction, from suppliers to manufacturers to the leader; the leader then distributes and markets the product to the consumers. It is clear from this Figure that the value chain leader is the interface between the consumers and the other value chain members.

Figure 3: Hierarchical Leadership in a Value Chain



While Figure 3 describes the importance of value chain leadership in mediating between the forces of supply and demand, it does not explain how such leadership originates. In general, two origins of value chain leadership can be identified. First, it tends to evolve out of a business's ability to fulfill consumer needs with innovative, novel, or niche products created through technical innovations or product differentiation. Examples of technical innovation abound in the consumer electronics and telecommunications market, including companies such as Nokia, Intel, Apple, and Dell Computers. Leadership through product innovation or differentiation is best illustrated by brand names such as Nike, Zara, and Boss in the fashion

14. Some may also suggest that the value chain leaders are also the ones who can create new products to serving emerging consumer needs.



industry. Second, value chain leadership can be created by a firm's ability to organize and coordinate the existing supply chain in a way that creates new value for consumers, either through a rise in efficiency or a fall in production cost. Such leadership is best exemplified by companies like Walmart, Dell Computers, Proctor and Gamble, Unilever, and Toyota. In both scenarios, the firms' ability to create value through new products or new processes gives rise to a strong market position in their own industry. Their market dominance is the result of their ability to develop a brand identity that consumers can relate to, one that communicates a certain unique and desirable quality to consumers. In turn, the resultant brand equity and loyalty lead to a high degree of market power that allows the firms to dominate a supply chain and become value chain leaders.

The above analysis suggests that upgrading China's global value chain position outside of product and process upgrading will take time. Developing brand equity in the global market will be challenging, and will require a skill set that Chinese firms have yet to demonstrate. Acquisition of foreign brand names and expertise will likely continue to play a major role in China's movement up the value chain in the near future. However, China's move up the learning curve is likely to accelerate as China exercises what Child and Rodriguez (2005) call the late-comers' advantage. As late-comers in the international economy, Chinese firms are now in a position to selectively acquire and invest in complementary assets and skills such as technology, brand knowledge, R&D capabilities, and internationally experienced management to address their value chain weaknesses. Lenovo's acquisition of IBM and Cheely's acquisition of Volvo are examples of "complementarity"-driven investments. Nevertheless, the long-term success of this strategy must not be taken for granted.

Much movement up the learning curve is still required of Chinese firms engaged in this strategy. Our analysis suggested that, to become global value chain leaders, Chinese firms must develop the value chain leadership skills and brand equity enjoyed by the current value chain leaders. China must be able to duplicate the skills, knowledge, and expertise required for value chain management and design. Chinese firms must develop the kind of capabilities that companies like Walmart, Intel, and Toyota are known for. Given that global competition is now between international value chains rather than individual firms, functional weaknesses at the top end of any China-led value chain would represent a major obstacle for Chinese firms. The corollary to this observation is the question of where China might enjoy an advantage and not suffer a disadvantage in assuming the leadership of a value chain. In other words, how would Chinese firms develop the value chain leadership skills necessary to become global value chain leaders? The answer may lie with China's domestic economy.

## 6. Upgrade through the Domestic Market

Most discussions of China's value chain strengths and weaknesses are undertaken in the context of the global value chain. However, given China's expanding economy and its growing impact on world trade, an analysis of China's future value chain position is not complete without taking into account its domestic developments. Indeed, China's pheno-

menal economic growth in the past two decades has transformed it into one of the most important consumer markets in the world. With most of the world mired in recession during the past two years, China has continued to expand and has emerged as a bright spot in the otherwise gloomy global economy. It is now the fastest growing market for Western branded luxury products in the world. A side effect of the stimulus measures applied by China to protect its economy from the global downturn in 2008 has been a stronger domestic economy. It is this rising strength of the domestic economy that will have a strong impact on China's move up the value chain.

As indicators of the growth in China's domestic market, the annual growth rates in China's real GDP and real per capita GDP are reported in Table 5. According to this Table, the average annual real GDP growth in China between 1991 and 2010 is an impressive 10.27 percent. The real per capita GDP growth for the same period of time is 9.40 percent. Despite the continual income gap between China and the developed world, this uninterrupted economic growth has helped lay the foundation for an emerging consumer market in China.

Table 5: Annual Rates OF Growth in Constant Prices, 1990 - 2009

Year	GDP	Per Capita GDP	Year	GDP	Per Capita GDP
1991	9.2	7.7	2001	8.3	7.5
1992	14.2	12.8	2002	9.1	8.4
1993	14	12.7	2003	10	9.3
1994	13.1	11.8	2004	10.1	9.4
1995	10.9	9.7	2005	10.4	9.8
1996	10	8.9	2006	11.6	11
1997	9.3	8.2	2007	13	12.5
1998	7.8	6.8	2008	9	8.4
1999	7.6	6.7	2009*	9.1	9.9
2000	8.4	7.6	2010*	10.3	8.8

Note: \* denotes figures calculated from data reported in *World Fact Book - CIA*, 2010 and 2011.

Sources: *China Statistical Yearbook* 2009 and *World Fact Book - CIA*, 2010 and 2011.

The domestic market is important for China's value chain upgrade in two respects. First, it can provide the proving ground for Chinese firms who wish to move up the global value chain. The home market constitutes a familiar landscape free of the challenges associated with operating in a distant foreign market. Firms can develop their products and competitiveness in a more familiar environment at home before venturing abroad. Indeed, the home market can become a friendly battleground for Chinese firms to begin their challenge to foreign competitors. If they cannot compete with foreign companies at home, what are their chances of success abroad? While this question is not merely rhetorical, the author recognizes that consumer markets might be segmented in a way that Chinese consumers of Western goods may not be attracted to Chinese products in the near future due to the status that

consumption of Western luxury goods confers<sup>15</sup>. However, cultural knowledge and familiarity should allow Chinese firms to take advantage of the large pool of emerging consumers and become leaders of competitive value chains at home. This implies a strategy of developing value chain skills and competitiveness by cultivating and serving the domestic market as it grows. The long-term effect would be production of sophisticated products and services that are uniquely suited to the needs and lifestyles of the Chinese consumer. Second, producing for the domestic consumer market helps China mitigate the constraint of existing value chain relations. It allows Chinese firms to circumvent the difficulty of competing with existing value chain leaders or brand names and accessing established international markets. The domestic market is where Chinese firms can exploit their productive capabilities to capture the leadership of emerging value chains at home<sup>16</sup>.

To the extent that similarity in consumer preferences exists between China and other developing countries, growth through the domestic market offers another benefit. It would allow China to develop its own value chains that would also serve markets in the developing world. The relatively minor presence of multinational retailers in developing markets, where the focus is on price competitiveness, creates a rather conducive environment for Chinese exports. China's price competitiveness will be a significant advantage in promoting its own value chains in these markets. Products from consumer goods to automobiles to electronics can be exported to non-Western markets through China's own value chains. In other words, exports to developing countries can offer another avenue for upgrading China's global value chain positions. In fact, this suggestion seems to be borne out by the activities of many Chinese firms who have expanded their exports of consumer goods, motorcycles, automobiles, and telecommunications equipment to Africa and Southeast Asia.

While the approach to value chain upgrade suggested above focuses on China's strengths, it does not necessarily suggest a retreat from Western markets. It simply points out where China's comparative advantages lie and where it may expect to acquire value chain leadership. Growth in the Chinese market should enhance China's international competitiveness as Chinese firms become more innovative and efficient over time.

## 7. Conclusions

China's desire to upgrade its position in the global value chain is driven by both market forces and policy impetus. It is natural that after two decades of economic growth, China has decided to try to move up the value chain and develop a more technologically advanced economy. This will allow it the opportunity to acquire and develop new technologies and build a foundation for a more advanced economy. China's efforts to develop and upgrade its productive capability at both the micro and macro levels will undoubtedly go a long way in assisting Chinese firms to accomplish the objective of moving up the value chain. This pa-

15. Western luxury goods have retained a following even in an advanced industrial economy such as Japan.

16. The recent closure of Home Depot and Best Buy outlets in China is an indication of the strength of Chinese firms in their home market and how they may leverage their local knowledge to compete with firms from abroad.

per proposes a framework to analyze the economic and policy issues pertaining to China's efforts to upgrade its value chain position. The framework delineates the underlying factors into supply-side and demand-side factors and brings to bear the relevance of market constraints and value chain relations. Unless existing global value chain relations are part of the analysis, any prognosis of China's value chain strategy based entirely on technical and endowment factors would be greatly incomplete. This approach points out the difficulty in overcoming existing value chain advantages enjoyed by the chain leaders and the need to remedy China's deficiencies in functions further up the value chain. To the extent that government policies are unable to alter global business conditions, domestic growth in China and trade with other developing countries will offer China a natural platform for future value chain development. This means policies to foster a more efficient domestic economy through greater domestic competition, a more efficient logistics system, and better allocation of financial capital should all be part of China's value chain strategy.

Efforts by China to move up the value chain also contain lessons for countries in Latin America. Inserting oneself into the global value chain can be a relatively expedient way to increase income and employment, but countries must be aware of the long-term constraints this approach might entail. The building of supply-side capability should be accompanied by a strategy to address the aforementioned value chain constraints and the need to develop a strong domestic economy over time<sup>17</sup>. China's experience is admittedly most instructive for countries such as Mexico and Argentina who have pursued a role in the North American value chain as an important growth strategy<sup>18</sup>. However, even Latin American suppliers of raw materials and resources should be mindful of the long-term implications of global value chain integration. Latin American nations must be cognizant of the long-term constraints and vicissitudes that would accompany the short-term economic benefits of global value chain integration.

17. Should the current discussions to promote freer trade and greater economic integration among Latin American countries prove to be successful, it would have the same effect as strengthening the demand side of the value chain for the purpose of value chain development.

18. The role of a low-cost, low-margin producer of manufactured goods for North America may render upward movements on the value chain and a high level of economic development difficult in the longer run.

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