

Global value chains in a changing world

Edited by Deborah K. Elms and Patrick Low



Global value chains in a changing world

Edited by Deborah K. Elms and Patrick Low



Disclaimer

Opinions expressed in this publication and any errors or omissions therein are the responsibility of the authors concerned, and not of the editors. Opinions expressed by the authors and the editors are their own personal opinions and should not in any way be attributed to the institutions with which they are associated.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion on the part of the NTU, FGI and WTO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Mention of specific companies or products does not imply that they are endorsed or recommended by NTU or FGI or WTO or preferred to others that are not mentioned. The names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by NTU, FGI and WTO to verify the information contained in this publication. However, this published material is distributed without warranty of any kind, either expressed or implied. Responsibility for the interpretation and use of the material lies with the reader. Under no circumstances will NTU or FGI or WTO be liable for damages arising from its use.

© Fung Global Institute (FGI), Nanyang Technological University (NTU), and World Trade Organization (WTO), 2013

Reproduction of material contained in this document may be made only with the written permission of the WTO Publications Manager.

ISBN: 978-92-870-3882-1

WTO Publications

World Trade Organization

154 rue de Lausanne

CH-1211 Geneva 21

Switzerland

Tel: + 41 22 739 52 08

Fax: + 41 22 739 54 58

Email: publications@wto.org

Web site: www.wto.org

Online WTO bookshop: <http://onlinebookshop.wto.org>

Printing by WTO Secretariat, Switzerland, 2013

Table of contents

Acknowledgements	v
List of contributors	vii
Illustrations	ix
Foreword by Pascal Lamy, Director-General of the WTO	xv
Preface by Victor K. Fung, Chairman of the Fung Global Institute	xix
Introduction	1
<i>Deborah K. Elms and Patrick Low</i>	
Part I Changing features of global value chains	11
1 Global supply chains: why they emerged, why they matter, and where they are going	13
<i>Richard Baldwin</i>	
2 The role of services	61
<i>Patrick Low</i>	
Part II Why and how we measure trade in value-added terms	83
3 Estimating trade in value-added: why and how?	85
<i>Nadim Ahamad</i>	
4 The implications of using value-added trade data for applied trade policy analysis	109
<i>Robert. B. Koopman, Marinos Tsigas, David Riker, and William Powers</i>	
5 Geometry of global value chains in East Asia: the role of industrial networks and trade policies	135
<i>Hubert Escaith and Satoshi Inomata</i>	
Part III Some issues for supply chain managers	159
6 Views of GVC operators	161
<i>Deborah K. Elms</i>	

7	The dynamics of global supply chains: the imperatives for success in a new market ecology <i>Henry Birdseye Weil</i>	171
8	Uncertainty and risk in global supply chains <i>Donald Lessard</i>	195
9	The influence of customer buying behaviour on product flow patterns between trading countries, and the implications for regulatory policy <i>John Gattorna</i>	221
10	Supply chain connectivity and trade in Asia <i>Mark Goh</i>	245
	Part IV Plugging into supply chains: designing policy for a changing world	261
11	Policies to improve the supply chain: what needs to be done? <i>Michael J. Ferrantino</i>	263
12	Can SMEs participate in global networks? evidence from ASEAN firms <i>Ganeshan Wignaraja</i>	279
13	The globalization of supply chains: policy challenges for developing countries <i>Ujal Singh Bhatia</i>	313
14	Global value chains and industrial policy: the role of emerging economies Gary Gereffi and Timothy Sturgeon	329
15	How have production networks changed development strategies in Asia? <i>Fukinari Kimura</i>	361
16	Expansion of global value chains in Asian developing countries: automotive case study in the Mekong sub-region <i>Masato Abe</i>	385

Acknowledgements

We would like to thank the Temasek Foundation for the generous financial support that allowed us to hold a policy dialogue event in Singapore in November 2012 that brought together many of the chapter authors from this volume together with trade officials from across ASEAN countries. The contributions of the speakers and participants at this dialogue contributed significantly to the quality of the final book chapters. We should also like to thank the Fung Global Institute for funding a number of the papers included in the volume and certain costs involved in producing this volume. We thank the WTO for its support in preparing the conference and for covering part of the costs of publishing the volume.

Several staff members from the Temasek Foundation Centre for Trade & Negotiations (TFCTN) were critical to the workshop. Special thanks to Swee Seng Quak, Adeline Lim and Juliana Binte Abdul Jaffar. Rupali Sarkhel Desai put in many, many hours in transcribing participant comments from the event and drawing up a set of summaries for each speaker. Lyn Ng and Esther Tsui of the Fung Global Institute also helped with various organizational aspects of preparing for and running the conference, for which we are very grateful. Special thanks are due to staff from the WTO: Paulette Planchette for her outstanding editing and proofing work, Veronique Bernard for work on the bibliography, and Serge Marin-Pache for taking care of the publication of the volume.

List of contributors

Masato Abe

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP),
Bangkok, Thailand

Nadim Ahmad

Organisation for Economic Co-operation and Development (OECD), Paris, France

Richard Baldwin

Graduate Institute, Geneva, Switzerland
Oxford University, Oxford, United Kingdom

Ujal Singh Bhatia

Member, Appellate Body, WTO, Geneva, Switzerland

Henry Birdseye Weil

Massachusetts Institute of Technology (MIT), Sloan School of Management,
Cambridge, MA, United States

Deborah K. Elms

Temasek Foundation Centre for Trade and Negotiations, RSIS, NTU Singapore

Hubert Escaith

World Trade Organization (WTO), Geneva, Switzerland

Michael J. Ferrantino

United States International Trade Commission (USITC), Washington DC, United States

Victor K. Fung

Chairman
Fung Global Institute, Hong Kong; Hong Kong, China

John Gattorna

University of Technology Sydney (UTS), Sydney, Australia

Gary Gereffi

Duke University, Durham, NC, United States

Mark Goh

National University of Singapore, NUS Business School, Singapore

Satoshi Inomata

Institute of Developing Economies, JETRO (IDE-JETRO), Tokyo, Japan

Fukunari Kimura

Faculty of Economics, Keio University, Tokyo, Japan

Economic Research Institute for ASEAN and East Asia (ERIA), Jakarta, Indonesia

Robert B. Koopman

United States International Trade Commission (USITC), Washington DC, United States

Pascal Lamy

Director-General

World Trade Organization (WTO), Geneva, Switzerland

Donald Lessard

Massachusetts Institute of Technology (MIT), Sloan School of Management, Cambridge, MA, United States

Patrick Low

World Trade Organization (WTO), Geneva, Switzerland

William Powers

United States International Trade Commission (USITC), Washington DC, United States

David Riker

United States International Trade Commission (USITC), Washington DC, United States

Timothy Sturgeon

Massachusetts Institute of Technology (MIT), Industrial Performance Center (IPC), Cambridge, MA, United States

Marinos Tsigas

United States International Trade Commission (USITC), Washington DC, United States

Ganeshan Wignaraja

Asian Development Bank Institute, Tokyo, Japan

Illustrations

Tables

1.1	Per capita industrialization levels, 1750–1913 (United Kingdom in 1900 = 100)	14
1.2	Backward linkage matrix for major supply chain traders, 2007	21
1.3	Selected deeper than GATT provision in RTAs	42
2.1	Services necessary to the Sandvik Tools supply chain	67
3.1	OECD input-output industry classification	101
4.1	Regions and sectors in the GVC CGE model	113
4.2	Estimates of exchange rate pass-through and the substitution elasticity	125
4.3	Numerical examples from the electrical and optical equipment sector in 2009	127
4.4	Average trade elasticity for each exporting country	128
4.5	Estimated trade elasticity for US imports from China	129
5.1	Nominal protection and effective protection rates in East Asia and the Pacific, 1995–2005 (percentage, <i>ad valorem</i>)	147
5.2	Sectoral average propagation length in East Asia, 2005 (selected cases)	150
8.1	Incidence of supply chain risks relative to capacity to absorb	211
10.1	Logistics requirements of key industry requirements	249
10.2	Supply chain infrastructure and location and criticality	251
10.3	Supply chain connectivity effort by APEC	257
12.1	Description of variables	287
12.2	Sample characteristics	289
12.3	Role of SMEs and large firms in production networks	290
12.4	T-test on key variables for SMEs in production networks versus SMEs outside production networks	294
12.5	Probit estimates	296
12.6	Perceived major or severe obstacles to conducting business, SME firms (per cent of SME firms)	300

12.7	SME firms' perception of business and support services	303
12.8	Selected studies on determinants of decision to export and participation in production networks in ASEAN	310
12.9	Correlation Matrix	312
14.1	Seven selected emerging economies in comparative perspective, 2011	334
14.2	Export profile percentages of total exports: 2011	336
14.3	Overview of industrial policies in emerging economies	340
14.4	Brazilian electronics exports, imports and production, 2007–2010 growth rates	346
14.5	Brazil's electronics-related industrial policies	348
14.6	Top global EMS and ODM contract manufacturers in 2011	349
15.1	Research and development expenditure (% of GDP) in ASEAN and other East Asian countries	372
15.2	Policies for a new development strategy	375
15.3	Changes in domestic operations in the period 1998–2002 and 2002–2006 by the type of firms, based on the two-year-balanced panel data	377
16.1	List of regional trade agreements including the Mekong subregion	389
16.2	Tariff schedules for automobiles and auto parts in the Mekong subregion	390
16.3	Automotive industry in the Mekong subregion	391
16.4	Obstacles to the development of global automotive value chains in the Mekong subregion	400
16.5	Sharing responsibility to strengthen automotive value chains in the Mekong subregion	403

Figures

1.1	Global trade flows and estimated trade costs, 1870–1975	15
1.2	Schematic illustration of coordination costs and the second unbundling	17
1.3	Regional measures of 21 st century trade, 1967–2007	18
1.4	Sector measures of 21 st century trade, 1967–2005	19
1.5	Reversal of the big divergence	22
1.6	Reversal of industrialization/de-industrialization trend	23
1.7	Unilateral tariff cutting by developing nations, 1988–2009	25
1.8	Indicators of FDI and 21 st century trade disciplines, 1957–2009	26

1.9	Tasks, occupations, stages and product – the TOSP framework	28
1.10	Supply chain unbundling: coordination versus information technology	30
1.11	Wage differences in Factory Asia, Factory North American and Factory Europe, 2008	31
1.12	Education and R&D: ASEANs, China, Republic of Korea, United States, Japan and Canada, 2005	32
1.13	Circular causality and agglomeration forces	33
1.14	Equilibrium location balances agglomeration and dispersion forces	34
1.15	Schematic illustration of function and location unbundling interactions	35
1.16	The smile curve: good and bad stages in the value chain	37
1.17	Breakdown of the phone's EUR 546 pre-tax retail price circa 2007	38
1.18	Future of international supply chains	44
1.19	Schematic illustration of computer integrated manufacturing	46
1.20	Indicator of supply chain trade North-North versus. North-South	49
1.21	How backward, forward and total supply-chain trade vary with income	51
1.22	Manufacturing GDP and incomes levels – nations below the turning point	52
1.23	Historical and forecast oil prices	54
2.1	Sectoral contribution to total trade, gross and value-added measures, 2008	62
2.2	A suit made in China and sold in the United States	65
2.3	Stan Shih's Smile Curve	73
3.1	Trade in value-added	86
3.2	Domestic content of exports (domestic value-added exports, per cent of total gross exports), 2009	91
3.3	Domestic content of exports (domestic value-added exports, per cent of total gross exports), 2005–09	92
3.4	Transport equipment, gross exports decomposed by source, US\$ billion, 2009	92
3.5	Electronic equipment, gross exports decomposed by source, US\$ billion, 2009	93
3.6	Intermediate imports embodied in exports, per cent of total intermediate imports, 2009	94
3.7	Services value-added – per cent of total exports, 2009	95
3.8	Services value-added – per cent of total exports of goods, 2009	96
3.9	Domestic content of imports – per cent of total intermediate imports, 2009	97

3.10	Difference between China's value-added and gross trade balances, US\$ billion, 2009	97
4.1	Linkages between processing trade in China, the rest of China, and Japan in the GVC Model	114
4.2	Sourcing of imported goods in the GTAP model	115
4.3	Sourcing of imported goods in the GVC model	116
4.4	Per cent change in GDP volume	117
4.5	US imports of electronics	118
4.6	Chinese imports of electronics	120
4.7	Chinese imports of steel	121
5.1	An image of demand propagation (automobile industry)	137
5.2	Calculation of average propagation length	138
5.3	Evolution of regional supply chains in East Asia: 1985–2005	141
5.4	Change of relative positions in the regional supply chains, 1985–2005	143
5.5	Trade, logistics and transportation – East Asia in perspective	149
7.1	A typology of enterprise architectures	172
7.2	Evolution of business ecosystems	173
7.3	A typical supply chain	174
7.4	Assessing strategic value	175
7.5	Dynamics of the value system	181
7.6	Destruction of the existing value chain	183
7.7	A model of relationship value	184
7.8	A typology of supply chains	190
8.1	Sources of risk for global supply chains	198
8.2	Sources of risk from inside to outside	199
8.3	Sources of risk and their supply chain impacts	201
8.4	Risk magnification via the “bull whip”	202
8.5	The reputational risk system	203
8.6	Global production sharing	205
8.7	Risk specialization in the value chain profit curve	207
8.8A	Impact capacity to absorb for specific disruption	210
8.8B	Impact capacity to absorb for a general disruption	210
8.9	Sources of global supply chain issues	212
8.10	Issue preparedness	214
9.1	The four most commonly observed dominant buying behaviors	224
9.2	Flow types and matching supply chain configurations	229
9.3	The new business model at Cash Services Australia	231

Illustrations

9.4	The new business model is needed to manage demand and capacity in multi-user supply chains	232
9.5	Elements of the ' <i>dynamic alignment</i> ' framework	233
9.6	Multiple supply chain alignment on the customer side	234
9.7	From static to dynamic configurations	238
9.8	Bilateral Import/Export Trade Flows (by key major product/service category)	240
10.1	Value of trade as per cent of GDP	248
10.2	Value chain side of a business	250
12.1	Share of SME and large firm exports in total exports	291
12.2	Share of top 25 per cent SME exporters	292
15.1	The fragmentation theory: production blocks and service links	363
15.2	Shares of machinery in total manufactured exports/imports to/from the world, 1994	365
15.3	Shares of machinery in total manufactured exports/imports to/from the world, 2007	366
15.4	Location of manufacturing sub-sectors, 2005	367
15.5	Cross-border production sharing and production "networks"	369
15.6	Two-dimensional fragmentation	370
15.7	Industrial agglomeration in Bangkok Metropolitan Area	373
16.1	Mekong subregion	386
16.2	Share of automotive goods trade, Mekong subregion, 2000–11	392
16.3	Growth in intra-automotive industry trade 2000–11	393
16.4	Major motives of FDI for the automotive industry in the Mekong subregion	394
16.5	FDI inflows to the automotive industry in the Mekong subregion	395
16.6	A simplified global automotive value chain	398

Foreword

Any discussion today of international trade and investment policy that fails to acknowledge the centrality of global value chains (GVCs) would be considered outmoded and of questionable relevance. The idiom might vary – referring to trade in value-added, production sharing, supply chains, outsourcing, offshoring, vertical integration, or fragmented production instead of GVCs – but the core notion of internationally joined-up production is the same. Every international agency dealing with economic affairs as well as many governments are working on various aspects of GVCs in order to understand better their various dimensions. The central concern from this quarter, of course, is what GVCs mean for trade policy and for international cooperation in trade-related matters.

While the business, management, economics, and development literature on GVCs goes back at least two decades, attention from the international policy community is much more recent. It is interesting to consider the process through which GVCs became more mainstream in policy thinking. A major initial influence came from the arcane world of statistics and measurement. Certain international and national agencies and academic institutions started to worry that by measuring trade in terms of gross values we were distorting the picture of bilateral trade balances, double counting trade flows, attributing production to the wrong geographical locations, incorrectly specifying the technological content of exports at the national level, and misunderstanding the true relationship between imports and exports. In short, we were simply failing to capture the true nature of economic relations among countries and the resulting policy implications.

Why, the argument went, should we measure and report international trade any differently from the way we measure and report domestic production? By measuring trade in gross terms, we were effectively saying that the entire value of an export could be accounted for by the last country on the supply chain. We needed instead to attribute value correctly, ensuring that the factors of production and other inputs contributed by each national location were allocated accordingly. No doubt one reason why progress towards measuring trade in value-added has been so slow is that the

data requirements of this approach are far greater than simply recording the gross value of trade flows.

Not surprisingly, considering the pattern of its economic growth experience over a number of decades in the second half of the twentieth century, Japan was a pioneer in this field. The Institute of Developing Economies-Japan External Trade Organization (IDE-JETRO) was one of the earliest agencies to develop international input-output matrices that reflected inter-industrial trade linkages. IDE-JETRO subsequently teamed up with the World Trade Organization (WTO) to develop this work further and measure value-added trade. The WTO launched its “Made-in-the-World” initiative aimed at raising public awareness and deepening analysis of the implications of GVCs. The OECD and WTO have also worked together to derive a comprehensive set of trade in value-added indicators from the OECD’s global input-output table. This cooperation led to the TiVA (Trade in Value-Added) initiative.

Another important initiative resulting in a matrix of international value-added trade comes from WIOD (World Input-Output Database), a grouping of European universities and other policy institutions, along with the Organisation for Economic Co-operation and Development (OECD), funded by European Union (EU) Commission. Other work contributing to international value-added measurement efforts has been undertaken by the United States International Trade Commission, the World Bank and the International Monetary Fund working with the Global Trade Analysis Project (GTAP) database. More recently, the United Nations Conference on Trade and Development (UNCTAD) derived trade in value-added indicators from EORA (another academic database initiative).

Much remains to be done on the statistical front, and this work will implicate a growing number of agencies, particularly at the national level. Further efforts and resource commitments are needed to refine the baseline for this kind of data analysis, improve and standardize measurement methodologies, and ensure regular updating. We have some way to go before trade can be routinely reported in value-added as well as in gross terms, but this should be the objective.

While statistics have been an important entry point for the international community to think about GVCs, the process of integrating these insights into policy is still at a fledgling stage. Some might argue that the GVC phenomenon is nothing more than turbo-charged international trade and that we have been concerned with trade and trade policy for centuries. But this “nothing really new” posture is

reductionist and misses the point that as technology has pushed out the frontiers of trade and intensified the degree of global interdependency, we need to rethink the very nature of cooperation among nations and what this means for policy. The “them and us” of much old thinking about trade has increasingly been shunted aside by an “us” focus. The politics have yet to catch up as policy strives to master the implications of GVCs.

Several policy-related insights in need of further analysis that will increasingly be factored into the decision-making process are particularly worthy of mention. First, intensified interdependency in international production relationships through GVCs inevitably implies greater mutual policy dependency. Because supply chains are integrated networks of production operations and not just a series of across-the-border transactions, they implicate multiple policy areas. These include the full spectrum of traditional trade policy concerns, investment policy, and a broad range of public policy-driven non-tariff measures affecting both goods and services. An adequate policy framework for cooperation must take an integrative view of policy and break down the compartments into which we still tend to separate different policy realms.

Second, the way supply chains are configured and supplied makes it less relevant than it ever was to think of individual markets as independent of one another. Markets are complementary and whatever affects supply and demand in one market will have ripple effects in other markets. Because trade and investment are increasingly interconnected, those relationships tend also to be of a long term nature, where stability and transparency are important attributes. This is another dimension of policy interdependency that must be taken into account. Third, the internationally joined-up nature of GVCs means that the impact of an upstream policy applied by one country on the supply chain will be multiplicative as goods and services cross successive jurisdictions downstream. This is an important dynamic implication of policy interdependency.

A fourth aspect of GVC-dominated production that has suffered from inadequate attention in a policy context is the role of services. Analysis of value-added trade has shown that services account for almost half of world trade – considerably more than traditionally estimated. The issue is not just quantitative. The nature of the contribution of services is also important. It goes beyond providing the glue that holds supply chains together. Services are often produced in conjunction with goods and represent crucial production components and potential sources of innovation and value-added.

We need an analytical framework that adequately embraces and measures the contribution of services to production.

Finally, a preoccupation of many governments is how to acquire as big a part of international value-added as possible along GVCs. This is a basic development challenge and is not only about the percentage share of value-added on any given supply chain. It is also about the quality of participation in terms of the capacity and opportunity to diversify into other activities. Much also depends on whether production located in a developing country is still owned and controlled by a lead firm, or whether it is contracted out to a domestic firm. What all this means for human skills development, income-earning opportunities, employment, and accumulation more generally is a key dimension for public policy makers. Many factors are crucial here, particularly on the supply side, as well as in terms of policy choices that governments might opt for to encourage development through engagement with GVCs. More than ever, public-private partnership is the backbone of any successful policy, as the nature and characteristics of global value chains is constantly evolving and flexibility and reactivity are key ingredients to efficient decision making. This partnership should extend beyond national borders, as global challenges call for international coordination from multiple stakeholders.

In sum, we face a wide array of challenges in adapting policy to GVC realities and using policy to shape those realities. As I have already suggested, policy is not devoid of politics and we need to work on the politics as well. Both policy and politics are rendered more complex by the speed of change today, fuelled by a continuing stream of new technologies and evolving market conditions. I welcome this volume for its contribution to deepening our understanding of the issues, and particularly for the richness of its eclectic and multi-disciplinary approach, involving supply chain practitioners, business and management specialists, economists, and policy analysts. I also welcome the institutional cooperation that made this project possible, involving the Fung Global Institute, the Temasek Foundation Centre for Trade & Negotiations, and the World Trade Organization.



Pascal Lamy
Director-General of the World Trade Organization

Preface

Governance through partnership in a changing world

Victor K. Fung¹

The evolution of global value chains

In the last three to four decades, government and business have been part of a far-reaching economic transformation, made possible by remarkable advances in information, communication and transport technologies. The proliferation of internationally joined-up production arrangements – that is, global supply chains – has changed our economic and political landscape in fundamental ways.

Advances in technology and an enabling policy environment have allowed businesses to internationalize their operations across multiple locations in order to increase efficiency, lower costs and speed up production. Businesses today look to add value in production where it makes most sense to do so; indeed this has become a key element of corporate competitiveness. For their part, some governments – though not all – recognize that participating in global value chains will bring value and opportunities to their workers and economies; they have thus sought to foster friendly policy frameworks.

For many economies today especially in Asia, imports are increasingly a key complement of local production and exports. Our trade figures in East Asia bear this out: intermediate goods have comprised over 50 per cent of exports and over 60 per cent of imports in Asia, since the year 2000. That is also why it is important to measure trade in value-added terms, rather than just looking at the gross figures. We need to know what each economy contributes to production at each stage of the supply chain.

When we measure exports in terms of their import content – we can understand domestic value-added. It becomes clear that so many products today comprise inputs from a number of countries. The reality which is not seen in gross trade statistics is that products today are “made in the world”, rather than made in a single country.

These production relationships embody the interdependence among nations that characterizes our world today. But when we look around us, it is not difficult to conclude that we should be managing our interdependency better.

Global value chains in a changing world

The predominance of supply chains in the economies of many countries calls for a careful consideration of where we are headed as a global community. We should be thinking about how to influence developments positively where we can, and adapt to them where we cannot. In the decades I have spent in business, I have learned that nothing stands still for very long. If anything, change today happens faster than ever.

What are some of these changes? Not so long ago it was common to assume that production took place in the East for consumption in the West. With the growth of the middle class in Asia and more policies to support domestic demand, however, the momentum for consumer growth is more likely to be in Asia than in the West. Companies must adapt their strategies and supply chains as a result.

At the same time, relative efficiencies and cost structures are changing, and production is becoming more complex – changes in the location of production are underway as some new locations open up and others seem less advantageous. These shifts in the global distribution of jobs and economic opportunity carry with them many challenges for governments, business and society at large.

When we talk about supply chains, we must remember how varied they can be, depending on what they produce, how they produce and where they produce. My involvement in supply chains over the years, for example, has mainly – although not exclusively – been in mass-market consumer products. Other supply chains involve lower turnover and smaller markets, often with a stronger technological component. Others still focus on capital goods and are more producer than consumer driven. Then there are the agricultural and natural resource supply chains. And we should not forget service supply chains.

Each of these varieties of supply chain has quite different characteristics, facing different challenges, and requiring different operating and policy environments. The variety adds complexity, and needs to be taken fully into account in analytical terms. But supply chains also have much in common, especially when we try to understand how they are affected by rapid change. Some of the most fundamental aspects of the challenges facing business and government decision-makers apply across the board, although perhaps to differing degrees.

I have already mentioned how patterns of consumption and production are changing across the globe, and forcing us to rethink old assumptions about the workings of supply chains and the shape of public policy. Another driver of change arises from faster communication and the spread of knowledge and information through the internet. Today consumers can find out the location and conditions in which a good is produced, and this power of information can inform their buying decisions. As a result, consumers and civil society are placing new demands on business and governments to meet their expectations. This makes for a better world, but clearly a more challenging one.

There will be other challenges as well. Production and consumption is increasing in Asia and other parts of the world as living standards rise and populations become better off, which is certainly a good thing. However, it also places new demands on the environment and depletes natural resources. Clearly, traditional growth models and patterns of consuming natural resources may be unsuited for a changing world, particularly one which will have 9 billion people by 2050. These issues require attention from both business and government. We need to produce and consume more sustainably, and foster innovation. Solutions here lie in the design of appropriate policies, which are properly administered, and achieve essential public aims while still enabling production and value creation in the private sector.

Sustainability has another important side – that of social inclusion and distributional equity. This is essentially about fairness. In terms of global value chains, it is about ensuring that those who manufacture and assemble goods share equitably in the benefits. It is about creating an environment in which small and medium-sized enterprises can participate in supply chains, without being shut out by costly regulation, poor administration or exclusionary behaviour.

More generally, it is about addressing growing inequality within and between societies. Governments clearly have a major role in these matters, supported appropriately by business. If we are not more successful in ensuring the legitimacy of our production,

growth and development models we will be threatened by much bleaker alternatives with consequences unwelcome to all.

A further challenge is how to manage a world with greater risk. As businesses, we face a number of risks relating to production models, market uncertainties and unpredictable consumer behaviour. But risk can also come from many other directions. Natural risks such as the Fukushima tragedy, the Thai floods, and other natural events need to be managed adequately through contingency planning and building redundancy into the supply chain.

Political risks such as 9/11 or terrorism call for constant vigilance. Financial risks emerge from fragile financial systems and the uncertain costs and availability of trade finance. While government or business may be in the front line in respect of one or other of these sources of risk, acting on shared responsibilities can make much difference to our capacity to prepare for and react to an uncertain environment.

Technology and technological innovation are fascinating issues, both for policy and industry. On the one hand, technology can help us deal with the global challenges we face today, such as climate change, resource scarcity or urbanization. Or the search for new technologies may simply be about finding the best ways of doing new and old things. These are all reasons why far-sighted governments and successful businesses devote attention to innovation.

But on the other hand, technological innovation can have great disruptive power. Companies' processes, production methods, skills and markets may quickly be rendered redundant by new technological discoveries. Old jobs may disappear as a result of robotics or 3D printing. This has happened throughout history and I suspect few would disagree with the view that we are much the better for the change despite the disturbance. But disruption means adjustment, and adjustment can be painful and punishing for groups within society. Ameliorating the process of adjustment and enabling these parties to contribute value to society again, is surely in the interests of the public at large and of business.

The need for common action and shared responsibility

I have ranged quite widely over issues facing global supply chains, and the economic and socio-political contexts in which they operate. I do see a natural convergence of

interests between smart policy, designed and executed in the public interest, and a long view taken by businesses reaching beyond next quarter's bottom line. I believe this is a natural partnership in the quest for good governance and a better life for people everywhere.

This brings me to the subject of international cooperation. My remarks about the relationship between business and government so far have mostly been about how cooperation should work in a national context, for the common interest, between policymakers, regulators, administrators and business.

Turning to a more international perspective, it is worrying to see how little success we seem to be having these days in fostering cooperation in which governments can advance common policies. We see this, for example, in the stalled Doha negotiations at the WTO, in climate change negotiations, and in discussions over a new international financial architecture.

There are many reasons that we have yet to resolve these pressing issues. But the longer we postpone needed action in these key areas, the greater the risks are that we are missing valuable opportunities and courting deterioration in the global landscape. This is not just a matter for a single region; it is the case for the entire world. Nor is it just a matter for governments, it is also for civil society and business as well. Ours is a world where we all need to recognize our common interests. We have a shared responsibility and we need fresh leadership and fresh thinking to galvanize action.

Much of what I have spoken about here underlies the vision that prompted my brother William and I to establish the Fung Global Institute in 2011 as an Asia-based think tank dedicated to generating and disseminating innovative thinking and business-relevant research on global issues from Asian perspectives. We are grateful for the opportunity to partner with the WTO and the Temasek Foundation Centre for Trade and Negotiations in this exploration of global value chains.



Victor K. Fung
Chairman of the Fung Global Institute

1 Adapted from the opening remarks by Dr. Victor K. Fung on the occasion of the Singapore Dialogue on Global Value Chains, 28 November 2012

Introduction

Deborah K. Elms and Patrick Low

Trade and production networks are not new. Firms have been producing items with components sourced from around the globe for centuries. Businesses have continuously sought out new markets for their products. What have changed, however, are the speed, scale, depth and breadth of global interactions. Increasingly, new players have become active in what have come to be called global value chains or global supply chains. This process of organization has brought entirely new issues to the table for consideration.

As this book highlights, global value chains (GVCs) have been rapidly evolving. As our knowledge and experience with different kinds of GVCs accumulates, the kinds of policy responses governments develop to encourage supply chain growth will need to change. Because GVCs come in all different shapes and types, it may not be possible or desirable to create a one-size-fits-all response. The kinds of data used to measure and assess changes in economic structures are being modified to better suit this new environment.

While governments may need to adjust policies, supply chain operators and managers are not standing still either. Firms operating in a GVC world need to remain nimble. They face a range of issues that can change rapidly, including new government policies, information technology shifts, consumer behaviour fluctuations, changes in logistics and so forth that may dramatically alter the risks that firms face.

Governments need to think about how to encourage a range of GVCs in order to improve prospects for growth and development. As GVCs have evolved, it has become easier for some smaller, less developed countries to participate in supply chains, provided that the appropriate policies are put into place. Challenges still remain for small country participation, however, as they do for small and medium-sized enterprises (SMEs). Many Asian economies have led the way in demonstrating how governments can create “hard” and “soft” infrastructure necessary for GVC

growth. Looking at specific country experiences highlights some key lessons that can benefit both the largest and smallest firms.

Origins of the project

This volume is an outcome of a Global Value Chains Policy Dialogue that was organized in Singapore on 28–30 November 2012 by the Temasek Foundation Centre for Trade & Negotiations in cooperation with the Fung Global Institute and the World Trade Organization (WTO). Versions of all but two of the chapters included in the volume were presented at the dialogue.

A primary objective of the dialogue was to engage policymakers from the region in a discussion of what the prominence of global value chains in the Asian region means for national economies and for national and international policymaking. A further objective was to traverse traditional barriers among disciplines in order to provide as comprehensive a perspective as possible on the nature and workings of GVCs, issues confronting them, the opportunities and challenges of participating in them, the interface between GVCs and policies, and future challenges. It was with this objective in mind that the resource persons participating in the conference included business operators, policymakers, economists, academic management and business specialists, political scientists and policy analysts. The varied nature of the perspectives brought to the dialogue by these different groups enriched the discussion and illustrated the multi-faceted complexity of the GVC phenomenon.

While some of the 16 chapters in the volume are not specific to the Asian region, a number of them are and this distinction has a bearing on how far individual contributions contain insights of relevance beyond the Asian region. The four parts of the volume look respectively at: (I) changing features of GVCs; (II) the measurement of trade in terms of value-added; (III) issues faced by supply chain managers; and (IV) aspects of policy design relevant to supply chains.

Volume summary

The summary of individual chapters that follows cannot possibly do justice to the contents and quality of the individual contributions. There is no substitute for reading the chapters. But this set of summaries will give the reader an overview of this broad based and wide ranging set of chapters.

In Part I, Richard Baldwin presents a long-term view of what has driven globalization over three centuries and what this means for global supply chains. The historical picture is dominated by what Baldwin refers to as the two “unbundlings.” The first of these was driven by the steam revolution and the second by the revolution in information and communications technology (ICT). The first unbundling was characterized by industrialization and rapid growth in today’s developed economies, a widening of the income divide between North and South, booming trade and migration, and local production agglomeration. Key features of the second unbundling included a surge towards industrialization in the emerging economies and the reduction in income dispersion between these economies and the industrialized ones. GVCs also emerged in the second unbundling, with all the complexities involved in networked trade, investment, services and innovation. For countries with the necessary infrastructure and policy framework, the emergence of supply chains in the second unbundling offers a richer menu of options for diversification, industrialization, growth and development.

The second chapter in Part I, by Patrick Low, addresses the role of services in GVCs. Low argues that the role of services in production and trade has been underestimated for a variety of reasons, and this has become a greater problem with the growing prominence of GVCs. A range of identification challenges help to explain the analytical deficit afflicting services activities compared to goods. The picture is complicated by the existence of market complementarities, modularized supply arrangements and the growth of service-intensive networks involving different technologies, entrepreneurship, and producer-consumer relationships that innovate and create value. Developing countries could use services as a means to upgrade their involvement in supply chain production. The chapter concludes by considering some specific issues related to data problems for services in GVCs.

Understanding the rapid changes taking place in GVCs requires good data. However, the statistics used so far to measure trade are problematic. The chapters in Part II of this volume consider the challenges of measuring trade differently using value-added methods.

Nadim Ahmad discusses how trade measured in gross terms has been unable to reflect modern trade patterns characterized by increased international fragmentation of production. Fragmentation is driven by technology, costs, access to resources and markets, and by policy reform. Ahmad discusses the micro and macro approaches to understanding trade in value-added terms. The former can only work at a product level, and has the limitation that it is difficult to go beyond the contribution of first-tier

suppliers, although it illustrates well the pitfalls of relying on gross measures of trade. Recent joint work by the OECD and the WTO has attempted to mainstream statistics on trade in value-added through their Trade in Value-Added (TiVA) initiative. This perspective helps to improve understanding of what underlies trade, growth and development, and to identify the true sources of value addition in production and trade. It also establishes a basis for exploring links between trade and the macro-economy; trade and employment; and trade and the environment. The chapter goes on to explore and draw lessons from early results from the OECD-WTO work.

Robert Koopman, Marinos Tsigas, David Riker and William Powers use a global trade in value-added database in conjunction with USITC data to undertake two simulation scenarios – one of a US tariff placed on imports from China designed to offset a low exchange rate and another that approximates a renminbi appreciation by a similar amount as the US tariff. These results are compared using value-added data and traditional measures of trade. A second application of value-added data involves an estimation of the degree to which changes in exchange rates and other prices are passed through to domestic prices rather than being absorbed. Again, these results are compared with outcomes using gross trade data. In all cases there are significant differences in results, with analysis based on value-added data telling a more convincing story both statistically and intuitively than analysis based on gross data.

Hubert Escaith and Satoshi Inomata focus specifically on East Asian trade. Using input-output data to measure value-added, Escaith and Inomata examine the contribution of production networks to industrial development. They document the role of policy in fostering regional integration and show how reductions in variance among tariffs diluted a bias against exports that typically accompanies inwardly-focused industrialization strategies based on domestic markets. They also looked at how improved logistics and administrative procedures reduced trade costs and facilitated the operation of production networks. A key message in this chapter concerns the centrality of policy in shaping industrial development based on trade.

Part III contains five chapters that examine various issues of relevance to supply chain managers. Deborah K. Elms summarizes the main points made by various representatives of the private sector who did not contribute their own chapters but were active in the discussions during the policy dialogue held in Singapore in November 2012. The points they focused on are a useful barometer of business sentiment about what matters, including issues like inventory management. The

discussion demonstrated the specificities associated with different kinds of supply chains. Several factors, including government policy, are important in determining how efficiently firms are able to manage this aspect of their operations. A recurrent theme was the degree of dependency firms had on trade and the importance of the conditions under which trade occurs. Government policy was a key factor. The supply chain operators highlighted some examples of improved policy environments, while others noted obstacles associated with regulations, standards and other barriers to trade.

The chapter by Henry Birdseye Weil covers a range of issues facing supply chains, stressing particularly the need for a dynamic focus of analysis. Changes in the landscape facing business that Weil stresses are related to the role of information technology, including widely available inexpensive broadband, innovations associated with e-commerce, and greater and speedier access to knowledge. Other pressures arise from the threat of disintermediation, wage and other cost pressures in a time of slackening demand and new market configurations (particularly in the case of China). Weil also stresses the importance of trust and brand loyalty in the evolving dynamics of supply chains. The author also goes through a range of decision points that inevitably confront supply chain operators and makes suggestions for how to manage rapid change in an uncertain environment.

Donald Lessard focuses on the effects of uncertainty and risk on supply chains. After considering different analytical perspectives on uncertainty and risk, Lessard identifies several types of risk: natural disruptions, man-made disruptions, government policy, innovations, external macroeconomic conditions, changes in demand, and risks internal to supply chains. He concludes that counteracting risk factors associated with diversification and the multiplicative impact of disruptions preclude any prior conclusion regarding the association between risk and the length of supply chains. Risk management involves processes of identification, analysis and risk mitigation strategies. The types of effective responses logically available for managing risk will change the probability of disruption, lessen the impact of disruption, or spread (diversify) risk. The chapter also makes distinctions among supply chain stakeholders in terms of their capacity to absorb risk.

John Gattorna examines the influence of consumer behaviour on supply chains, arguing that adequate responses to the wide array of challenges facing supply chains must take account of the particularities of human behaviour. Economic and business model analyses are not enough. Gattorna spells out a range of observed

patterns of consumer behaviour. These include the existence of a finite number of consumer behaviour patterns in any given market, the fact that the dominant behaviour pattern can change temporarily in response to external pressures, more permanent changes in consumer behaviour are internal to the consumer, and more than one kind of customer behaviour can be observed within single corporate structures. All these observations clearly carry implications for supply chain configurations. The chapter goes on to identify four kinds of buying behaviour: collaborative, transactional, dynamic and innovative. The author suggests different approaches to identifying consumer behaviour and ways that it may change, and also breaks down different supply chain categories in order to facilitate this task.

The final chapter in Part III, by Mark Goh, considers the role of logistics in supply chain management. Key ingredients of effective logistics include low cost-to-value and time-to-value ratios for goods and services along supply chains. Flow efficiency, security in the transfer of goods and services, and reliability in delivery are also important ingredients of good connectivity. Good connectivity also relies on high quality physical and soft infrastructure, which can sometimes be most efficiently ensured through public-private partnerships. The regulatory environment is also crucial. The chapter reviews different priorities in terms of good connectivity according to industry categories. It also discusses the challenges facing Asia Pacific Economic Cooperation (APEC) countries in the Asian region, as well as a range of initiatives taken to improve connectivity.

Papers in Part IV look at how enterprises and countries supported by governments can plug into supply chains and discuss a range of challenges involved. Michael Ferrantino is concerned with what is required on the policy front to improve the operation of supply chains. Ferrantino reviews a wide range of policy areas that matter, including infrastructure, transportation, administrative interventions affecting logistics, and product standards. He distinguishes between policy areas where reform can be costly and will take time, such as improving physical infrastructure, and changes that yield rapid results and often cost less. Among the latter are customs reform, transport deregulation and market access improvements in such areas as logistics, express delivery, telecommunications and retailing. The author emphasizes that reforms focusing on “hard” and “soft” areas of action should, as far as possible, be undertaken in parallel and not sequentially, notwithstanding differences in cost and the speed of results. Some of the most effective changes in terms of costs and effectiveness may arise from “soft” options such as customs reform. He also emphasizes that while overall a country gains from reducing the costs of trade, entrenched vested interests may well seek to impede the reform process.

Ganeshan Wignaraja presents evidence from firm-level data collected in the Association of Southeast Asian Nations (ASEAN) region of the extent to which small and medium sized enterprises (SMEs) participate in international production networks. This issue is important because SMEs account for the majority of firms and half the employment in the ASEAN region. The contribution of SMEs to supply chains is likely to be underestimated by the exclusion of indirect exports in some of the few studies that do exist. Wignaraja's chapter uses two different methodologies – econometric analysis and more qualitatively oriented survey analysis of perceptions among SMEs of the difficulties they face. The chapter finds that a minority of SMEs in the ASEAN region participate in production networks, and that they are generally minor players compared to larger firms, but there are important differences among countries. Those SMEs that do participate tend to be larger than those that do not, to have higher foreign equity participation, are staffed or owned by individuals with higher education attainment levels, and are (on average) newer firms. The perception data suggest that impediments to participation, especially competitors in the informal sector, smuggling and price fixing are important. A trust deficit was found to influence the degree of SME participation in production networks. Other prominent constraints include access to finance, poor infrastructure, skill bottlenecks and corruption. The author concludes that both the econometric and perception data analyses provide useful clues for the directions that policy reforms should take.

Ujal Bhatia Singh analyzes challenges for developing countries in participating in GVCs, illustrated with the experiences of the South Asian apparel and Indian automotive industries. He emphasizes the need for a holistic appreciation of the policy framework that helps to determine participation possibilities and stresses the need for strong domestic market integration. Regional value chains and an emphasis on services may provide a bridge for more global participation in the future. But risk management is a significant challenge. Policies are sometimes crafted to give advantage to large countries and dominant lead firms. The policy challenge for developing countries is often compounded by the absence of multilaterally-based policy coherence and the continuing proliferation of overlapping regional arrangements. Governments are clearly interested in the developmental potential of GVCs and in finding ways of upgrading along supply chains and ensuring adequate income levels and employment opportunities. Meeting these challenges requires adequate preparedness on the supply side based on well-integrated domestic markets, but external impediments can frustrate these efforts and need to be negotiated.

Gary Gereffi and Timothy Sturgeon look at the scope for industrial policy linked to GVC participation in emerging economies. Gereffi and Sturgeon argue that the classic debate on the role of governments in developing and diversifying their domestic economies through industrial policy pre-dated the adoption of GVCs as an organizing framework for understanding industrial development. The main difference between the early debate and the world of GVCs is that the focus today is more upon vertical specialization and the possibility of moving into higher-value niches, rather than nurturing national champions. The interface between global and local actors intrinsic to GVC realities means that lead foreign firms are less receptive to government policies aimed at involving local suppliers in GVC production. Large economies have greater scope for leverage than small ones, which gives the emerging economies a distinct advantage. The authors distinguish between horizontal and selective policy interventions, the factors that drive these, and what makes them more or less feasible. A case study of consumer electronics in Brazil is used to illustrate the scope for GVC participation by an emerging economy and the associated challenges. The authors argue for a balanced approach to GVC-oriented industrial policies, and argue that although some features of GVC-related policies may – on the face of it – look like old-fashioned import substitution there are important differences relating to the targets and objectives of intervention.

Fukunari Kimura analyzes how production networks have changed East Asian development strategies. Kimura argues that the advanced stage of production network development in East Asia has resulted in a situation where, under the Baldwin-defined ICT-driven second unbundling, production fragmentation and industrial agglomeration are occurring simultaneously. The author discusses how fragmentation characteristics of production networks allow countries to jump-start industrialization. Countries that have successfully achieved this and attained middle-income status in East Asia and aspire to industrial country status can promote this objective through the formation of industrial agglomerations. This development contrasts with continued reliance on fragmented arrangements in production networks between Mexico and the United States, and between Eastern and Western Europe. Kimura explains how the development of agglomerations facilitates the participation of local firms in production networks. Agglomerations are more stable than fragmented networks and, as long as local firms can compete, they are likely to enjoy more opportunities to engage. Technology spillovers may also be greater. The author also discusses the different policy options available to foster participation in situations of both fragmentation and agglomeration. He goes on to discuss options open to developed economies to slow down de-industrialization. The chapter concludes with a discussion of risks associated with macro shocks transmitted through production networks.

The final chapter in the volume, by Masato Abe, presents the results of firm surveys on the automotive sector in the Mekong Subregion. The chapter analyzes the key drivers of GVCs in developing and least developed countries, the role of sectoral characteristics in facilitating engagement, and the contribution of policy. Surveys indicate the intention of firms to expand their operations in countries such as Cambodia, Lao PDR and Myanmar. Apart from access to labour, the attraction of these countries for lead firms in GVCs is partly influenced by progress made in policy areas such as trade opening, trade facilitation, a friendly regulatory environment, and the development of logistics. However, the surveys also identified long lists of policy improvements that firms would like to see in order to improve the situation. These lists are organized in the chapter under the headings of trade liberalization, trade facilitations and logistics, infrastructure, policy and regulatory framework, labour market, and business strategies. The author concludes that reforms in these areas would be facilitated through collective action among governments in the region and public-private partnerships, with support from international agencies.

Concluding observation

The chapters in this volume showcase some of the cutting-edge thinking and research on GVCs from a variety of different perspectives. Our understanding of what makes supply chains work better and more efficiently undoubtedly lags developments on the ground. Operators in dynamic regions of the world like Asia are busily creating, revising, destroying and rebuilding chains on a daily basis. Sometimes they do so with the helpful and active support of government policies. Often, they are forced to work around policy challenges. It remains our hope that this volume will contribute to a more nuanced discussion of GVCs and the policy dimensions necessary to encourage their growth in the future.

