Chapter 12

Integrating China's Small and Medium Enterprises into International Production Networks: Barriers and Policy Responses

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Small and medium enterprises (SMEs) play an important role in China's economy, contributing a significant share of GDP, employment and tax. As China has been increasingly integrating with the world and regional economy, SMEs have been presented with opportunities to be part of international production networks. However, their lack of access to external financing, weak business capabilities, less competitive prices and quality of products, and a deficiency of market information have proved to be major barriers for their integration into networks, as suggested by this survey conducted in Tianjin city, China. The survey also shows that other significant factors inhibiting integration include the location of an SME, measured both by distance to a major sea or air port, and by whether or not it is situated in a development zone, the education attainment of its employees, the size of the SME and the industry in which it operates. Policy needs to address both the barriers to integration and the most needed assistance, as perceived by the SME. Based on the survey, China should improve the access of SMEs to financing by adjusting the financial structure and market, strengthen the business capability of SMEs by better public service, modernize the information service to SMEs, and improve the use of development zones so as to boost integration.

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1. Introduction

1.1. Overview

SMEs play an important role in China's economy, contributing a significant share of GDP, employment and tax. As China has been increasingly integrating with the world and regional economy, SMEs have been presented with opportunities to be part of international production networks. Evidence suggests that being part of a network would help an SME to grow quickly, to upgrade itself technologically, and to improve its profitability. In an increasingly globalised economy, integration into international production networks is a sure route to success for an SME. However, there are also daunting challenges for an SME before it can join a network. This survey-based study organized by ERIA tries to identify the major barriers for SME integration. Based on analysis of the survey results, a policy recommendation will be put forward.

1.2. Literature Survey

1.2.1. SMEs in International Production Networks

China's accession to the World Trade Organization (WTO) gave a big push for China's SMEs to participate in international production networks. Although national data are lacking, some empirical studies reveal that China's SMEs are now more involved in international production networks than before. For example, the Haige group, an SME from Heilongjiang province, provides remote controllers for all DVD players produced by Philips. Additionally, a Shandong chicken farm won a contract with Kentucky Fried Chicken to provide chicken products to this multinational with worldwide operations (Liu Dandong; Jiao Hongyan, 2004).

But there are still daunting challenges and difficulties for SMEs to overcome if they

wish to be integrated into international production networks. First, the SME is, more often than not, poorly equipped, so its product barely meets the quality requirements of an international production network. A survey showed that in the Pearl Delta region, a highly developed region in China, only 1% of SMEs are equipped with internationally advanced machines or installations, 58% of SME's have equipment at the middle or even at a low level domestically, in terms of technology. (Liang Da, 2008) Second, related to first challenge, an SME in China is not usually capable of conducting R&D activities. But joining international production networks involved an amount of R&D, such as remodeling products to meet network requirements of, or carrying out continuous quality improvement. In China, SMEs account for less than 40% of total R&D expenditure, much lower than the level in a developed country. 70% of SMEs spend less than 1% of turnover on R&D. Many believe that only those companies which spend 5% or more of turnover on R&D are viable. Third, SMEs are usually financially weak, with very low operation margins, and are unable to afford international information gathering and product promotion. So an SME is less likely to gain access to international markets. Fourth, difficulty in accessing financing also contributes to the misery of an SME involved in international trade, since in many transactions payment comes only after delivery. Furthermore an SME needs to raise funds to finance its production activity. In China, the banking sector is dominated by big banks. Due to high transaction costs and SME lack of collateral, the big banks are reluctant to lend to an SME. The SME also usually fails to meet the requirements for capital market fundraising. As a result, China's SMEs rely greatly on internal financing or informal financing, seriously limiting their expansion. Fifth, the SME also suffers from its low credibility. Without a proven track record, an SME very often finds it difficult to win the trust of a potential partner. Sixth, intermediary services such as consultancy, accounting

and legal services in China are not well developed. This situation, on the one hand, prevents the SME from being more specialized. On the other hand, the SME has to face the difficulties unaided by proper assistance from professionals.

1.2.2. Major Policy Initiatives to Promote SME Development

Well aware of the difficulties faced by SMEs, China's government has worked out policy initiatives to tackle them. In June 2002 China promulgated its first SME promotion Act. In February 2005 the State Council issued a policy paper aimed at encouraging, supporting and guiding the development of the non-state-owned sector; In 2006, in the 11th National Development Plan, the government launched a project aimed at promoting the growth of SMEs; Most recently, in August 2009 the State Council issued 6 new policy measures for promoting SME development in the context of the financial crisis (China SME Information Net, 2009).

The main contents of the policy package include:

1. Creating an enabling environment in which SMEs can fairly compete with big business and be treated equally. SMEs should also enjoy some preference in the government procurement market and a grace period for contribution to the Social Security Fund.

2. Mitigating the difficulties of access to financing by SMEs by establishing a risk compensation fund for loans made to SMEs. Also a multi-layer SME loan guarantee fund jointly financed by central and local government will be put in place. In banking supervision, a differentiated standard should be applied to SME related business so as to give the banks extra incentive to make loans to SMEs. A Nasdaq-like stock market will soon be launched to increase access to direct financing by innovative SMEs.

3. Increasing fiscal support to SMEs. First, to increase the funds set aside for SME

development in the central government budget, in order to support innovation, restructuring and employment. Then to launch a state SME development fund as soon as possible, encouraging more private funds to invest in SMEs. Finally to apply tax credits to SMEs with small margins.

4. Speeding up the technological progress and restructuring of SMEs. Central and local government should set aside funds in their budgets to support the technology upgrade of SMEs. Cooperation between big and small enterprises is also encouraged.

5. Supporting qualified SMEs to participate in government-sponsored consumption-boosting programs, such as the program for home appliances, cars and motor cycles for rural areas, and a “cash for clunkers” program.

6. Strengthening and improving the service to SMEs by actively fostering the institutions that provide professional services to SMEs. Also building a public platform, incubator, and information network for better service to SMEs. Finally reducing red tape for a better regulatory environment.

2. SMEs in the Economy and in Production Networks

2.1. SMEs in the Economy

National economic census data show that SMEs represent 99.81% of total enterprises, with middle sized enterprises accounting for 1.78%, and small businesses 98.03%. In 2004 the total operation revenue of SMEs reached 1.67 trillion RMB, accounting for 60.42% of the total. It is estimated that SMEs accounted for 60% of national GDP, and 50% of total government tax revenue. SMEs in the industrial sector contribute 66.28% of total industrial output and 55.17% of total tax. These data show

that the SME is and remains the mainstay of China's economy.

SMEs play an even bigger role in creating employment. National economic census data reveal that SMEs account for 81.89% of total non-agricultural employment. Most Chinese SMEs are in the private sector. In past decades, the state owned sector, dominated by big businesses, has been shedding jobs. This situation makes SMEs a major creator of new jobs. In 2006, the private sector provided jobs to 1.1 million unemployed，accounting for 75% of the total unemployed.

SMEs also play an important role in innovation. In China, 66% of total patents are owned by SMEs. 82% of new product development is done by SMEs. In the high tech sector, SMEs are also very active. Statistics show 98.4% of enterprise situated in national high-tech industrious parks are SMEs, in industries such as ICT, biotech, new materials, consultancy, design and modern logistics.

Up to now, the SME's role in the foreign trade sector has not been recorded by official statistics. However, a widely accepted estimate is that SMEs account for 70% of total foreign trade. In the labor-intensive sectors, such as apparel, clothing, toys and shoes, SMEs may account for 90% of exports. In some high tech sectors, such as ICT and biotech, SMEs are seeing a rising share of exports.

2.2. SMEs in International Production Networks

Based on the literature survey and our own observations, we can tentatively summarize several ways in which SMEs can be integrated into production networks. One is the "flagship enterprise" model. With relatively sound infrastructure, low labor cost and a comprehensive industry system, multinationals poured into China and built production facilities here. The domestic SMEs therefore got the chance to join the supply chains of those giant multinationals. For example, in Dongguan, Guangdong

Province, many SMEs became involved in PC production networks, producing cases, keyboards, mice, power sources, cables, etc. The second model of how SMEs can be integrated into international networks is the SME cluster. In some areas of China, especially in Zhejiang Province, there is a large number of SMEs in the same industry located together. This gives an SME in a cluster an advantage in information, supply of raw materials, and transfer of technology. Many of these SME clusters are in the export sector, whereby the SME can access international production networks. For example, more than 500 lighter producers, almost all of them SMEs, concentrate in Wenzhou City, Zhejiang Province, accounting for 70% of total worldwide production. The third model is of Original Equipment Manufacturer (OEM). There is quite a large number of SMEs in the apparel and electronics sectors who joined networks by way of OEM. These SMEs usually have strong production capabilities, but are weak in design and marketing. The fourth model is e-commerce. In the past decade, China witnessed a boom in e-commerce. For example, Alibaba, a startup 10 years ago, is now a world leading e-commerce company. The sales volume of the Alibaba platform has been larger than that of any mortar and brick retailer in China. There are many e-commerce companies devoted to providing service to SMEs to facilitate their participation in international trade. E-commerce helps SMEs to break information barriers, making it possible to access markets previously inaccessible.

3. Preliminary Results of the Survey

3.1. Introduction

The survey was conducted by the Tianjin SME Service Center (TSSC), which is

affiliated to the Tianjin Municipal Economic Commission and the Tianjin Bureau for SME Promotion. TSSC was created in 2001 to provide various services to SMEs, such as consultancy, training, legal services, marketing information, expo and business travel services and financing and credit guarantees.

The choice of Tianjin as survey site is based on the following facts. Tianjin is one of four municipalities directly administered by central government; the three others are Beijing, Shanghai and Chongqing. In recent years Tianjin has been emerging as the new economic powerhouse of China, boosted by big projects, both domestic and foreign. Among them, the Airbus assembly plant- the only one outside Europe- is best known. The automobile and electronic sectors are among the most important in Tianjin, and foreign enterprise plays a big role in these sectors. Tianjin is also biggest port in north China. All these factors provide potential opportunities for SMEs to be integrated into international production networks.

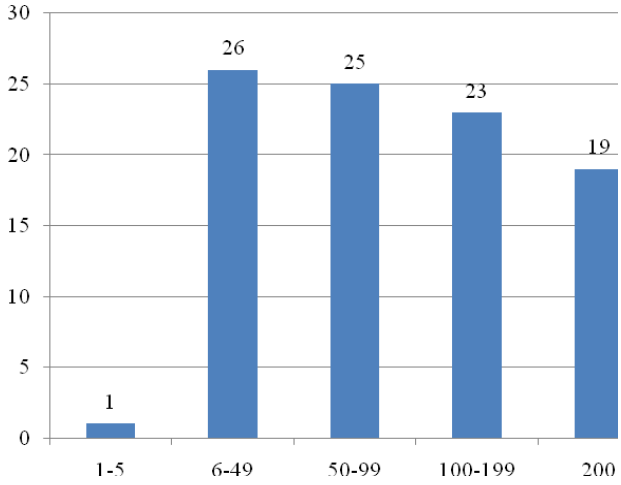
TSSC randomly selected the SMEs for survey and distributed the questionnaires to them through its subsidiaries, with guideline that give full explanation for each entry in the questionnaire. Telephone help was also available. In total about 250 questionnaires were distributed, the total returned was 167, and the total useable was 101. The low responding and useable rates, 66.8% and 60.5% respectively, may be due to SMEs' reluctance to disclose their financial information, as the timing of the survey coincided with special tax collection efforts by the Chinese government to meet its tax revenue target in the second half of 2009.

3.2. The Characteristics of the Sample

The total of useable samples collected in the survey was 101. The size of most SMEs surveyed is between 6-200 employees. The SMEs in this size range account for

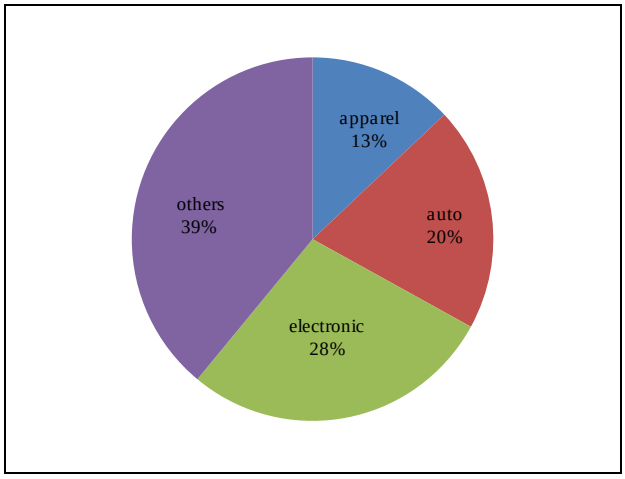
80% of the total, and are almost evenly distributed between three size groups, namely 6-49, 50-99, and 100-199 (see figure 1). There are also some middle sized SMEs, defined here as having more than 200 employees, accounting for 20% of total. However, there was only one micro SME, employing less than 5 people, in the sample. The size distribution of the sample is consistent with the general situation of China's SME sector, which usually outnumbers its foreign counterpart in terms of employment.

Figure 1. Size Distribution of SMEs



As for the distribution of SMEs by industry, 60% of SMEs are in the targeted industries of this survey, namely apparel, auto parts and electronics and electrical appliances, which account for 13%, 20% and 28% respectively. The remaining 40% are mostly in the service and technology sectors (see figure 2)

Figure 2. Industry Distribution of SMEs



In the sample, 44% of SMEs are less than 5 years old, while those older than 10 years account for 36%. The 6-9 years old SMEs account for 20% of the total. The relatively low proportion of middle aged SMEs may suggest that the 6-9 year-old period is the most difficult time for SMEs. If they survive this period, then they will live quite a bit longer.

Most SMEs in the sample are domestically owned, accounting for 92% of total. The SMEs with foreign shareholdings account for about 8% of the total. And SMEs with a government stake holding are few and far between, only accounting for 3% of the total.

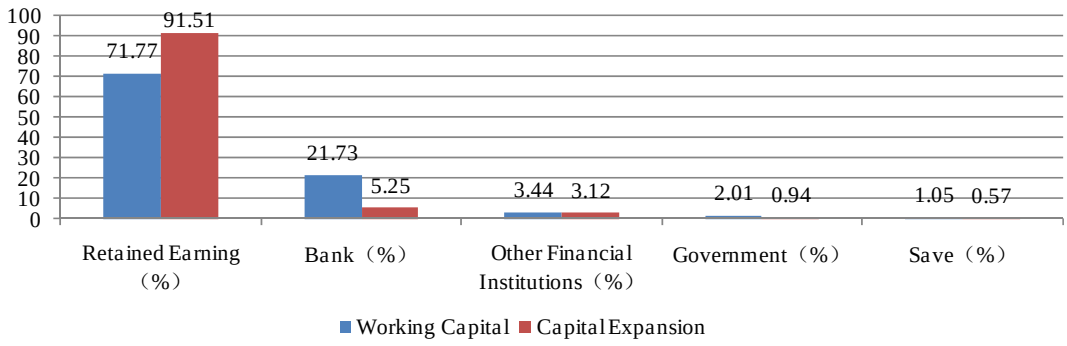
The SMEs in the survey did quite well between 2007-2008. As the whole, total sales grew by 31.7%. 80% of SMEs recorded positive growth in this period. The average sale in 2007 was 4.82 million US dollars and 6.35 million US dollars in 2008. However, there are big differences among SMEs in terms of total sales. The bigger ones could be several hundred times larger than the smaller ones.

In the cost structure of the SMEs, raw materials and intermediate inputs are the biggest part of the cost, usually accounting for 30-60% of total cost. In our sample, 60% of SMEs reported their materials cost shares fell in this range. The sample-wide average share is 49%. The median of the sample is 45%. The labor cost just followed the

materials cost, usually accounting for 10-30% of total cost; more than 60% of the surveyed SMEs were in this range. The average share of labor to total cost is 22% and the median is 20.5%. Utility cost, was a close third, with average share of 19.1% and median 20%. Interest cost is negligible for most SMEs as they seldom rely on external financing.

The survey confirms that internal financing is a predominant source of SMEs' financing. This is especially true for capital expenditure. In our sample, retained earning accounts for 91.51% of capital spending and 71.77% of working capital respectively. Bank lending serves as the second important source of SME financing. It is quite significant for financing working capital of SMEs, accounting for 21.73%. In capital spending, bank lending is less important, accounting for only 5%. The other sources of financing are negligible, their combined shares in the total SME financing, including both working capital and capital spending, are less than 10%. The financing difficulties of SMEs are not limited to the availability of finance, but also include its cost. The survey showed that the interest on borrowings of SMEs is as high as 20% while the prevailing rate of one year lending now stands at 5.31% (see figure 3).

Figure 3. SME Financing Sources



Most SMEs have multiple sources of raw materials and components. Local SMEs

and other domestic suppliers are equally important, both with 54% of SMEs who are their clients. The local large business, however, is less likely to be a supplier of local SMEs, with 48% of SMEs having such supply relations (see table 1). The plausible explanation may be that SMEs are more suppliers to, rather than clients of, local large business.

Table 1. Sources of SME Raw Materials and Components

Q8	AVERAGE	Percentage
Other Local SMEs	66.97%	54.00%
Local Large Firms	67.11%	48.00%
Other Domestic Suppliers	67.03%	54.00%

The SMEs also have multiple sales channels. Sales to final assemblers, and to direct retailers or wholesalers, are most important, with 59% and 46% of total SMEs respectively involving these two activities. Sales to first tier component producers are also common, 45% of SMEs do this. Sales to second and higher tier producers, however, are significantly less common. Less than 30% of SMEs do this (see table 2).

Table 2. SME Sales Channels

Q9	Average	Total	Small	Middle	Large
Final Assembler	47	59%	35.59%	16.95%	47.46%
First Tier	42.29	45%	46.67%	22.22%	31.11%
Second Tier	37	28%	67.86%	17.86%	14.29%
Third Tier and More	25	24%	75.00%	20.83%	4.17%
Retail and wholesale	62.86	46%	47.83%	36.96%	15.22%

About two thirds of SMEs carried out at least one activity that would help strengthen their business capability in the past three years. The most common activity was involvement in a business association, R&D network and/or trade fair. 71% of SMEs reported they carried out this activity. Also, 69% of SMEs reported they introduced new

production methods or new products or services in the past three years. However, the SMEs who reorganized their structures are among a minority, only 46% of SMEs did this. It seems that China's SMEs are more concerned with technology change rather than with changes to management and organization.(see table 3)

Table 3. Activities that Strengthen the Business Capability of SMEs

B	A
international standard	65%
Introduced ICT	61%
new divisions	46%
business associations	71%
new machines	66%
existing machines	65%
new production methods	69%
new products or services	69%
new market	51%
new technologies	66%

The survey shows that the quite a few SMEs have received assistances from government and other sources. As many as 65% of SMEs received management training, or training in marketing, accountancy and financing, and more than 90% of them found the training was effective. (see figure 4)The other assistance that quite a large number of SMEs received was counseling and advice, the provision of market information and technology development. More than 45% of SMEs reported they received this kind of help. And this help was thought effective by most SMEs, with an approval rate of 70% or higher. The assistance that was not offered very much included improvement of the investment climate, financing, and business linkage. Less than 40% of SMEs had ever got this kind of help. (see table 4)

Figure 4. The Proportion of SMEs who Received Assistance and Rated it Effective

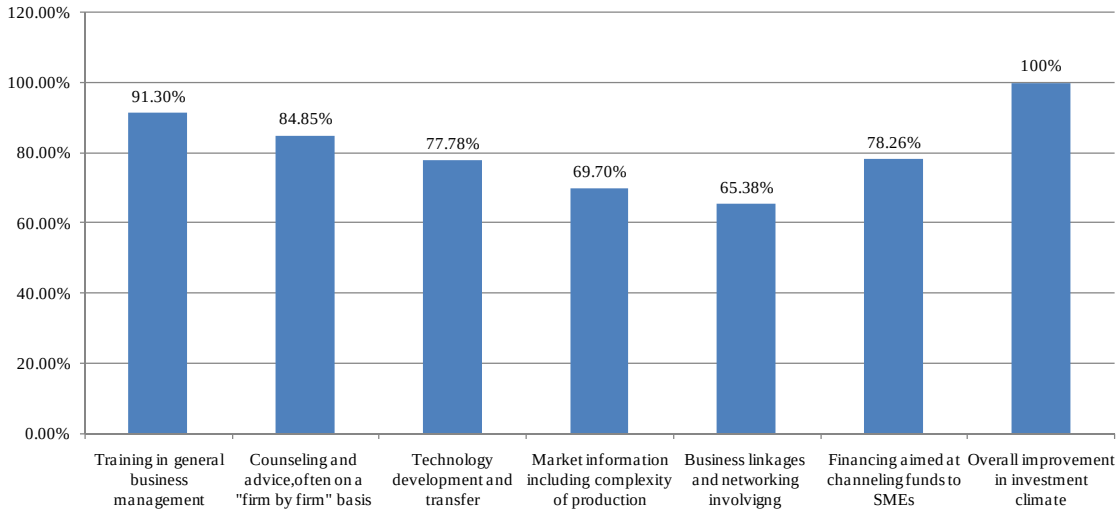


Table 4. Assistances Received By SMEs

Q12	total	in	Out
Training	64.95%	53.85%	67.06%
Counseling and advice	52.81%	41.67%	54.55%
Technology development	46.59%	33.33%	48.05%
Market information	47.73%	50.00%	47.37%
Business linkages	35.87%	38.46%	35.44%
Financing	39.13%	38.46%	40.00%
Investment climate	34.09%	38.46%	32.89%

3.3. The Characteristics of SMEs In and Out of Production Networks: Evidence from Description Statistics

The SMEs that are part of production networks show different characteristics from SMEs that are not, as descriptive statistics reveal.

First, the SMEs which belong to production networks are more concentrated in the auto parts industry than other industries. 75% of SMEs in the auto parts industry are members of production networks compared to 26% of SMEs in electronics and other industries. The SMEs in the garment industry are least likely to belong to networks. This result is not surprising, as an SME is rarely a final assembler of automobiles, while an

SME is much more likely to be a provider of final products in the garment sector. (see table 5)

Table 5. Distribution of SMEs in Production Networks by Type and Age

Type	Production network					
	1-5	6-49	50-99	100-199	>200	Total
1.Garments	0	0	0	0	0	0
2.Parts,Components,and Automotives (including motorbikes)	0	3	3	4	5	15
3.Electrical, Electronics, Parts and machinery	0	3	0	2	2	7
4.Other	0	4	0	4	2	10
Total	0	10	3	10	9	32

Second, the SMEs which are members of production networks are more likely to locate close to a port as table 6 suggests (see table 6). 100% of SMEs in networks are within 2 hours of a port while the percentage for SMEs outside networks within 2 hours of a port is 80%. 30% of SMEs in the networks are within 30km from a port; for those outside networks the percentage is 15%.

Table 6. Time and Distance from a Port

Hours	Frequency(%) by status in production network	
	OUT	IN
Near Port(less than 0.5 hours)	0	5
Moderately near(between 0.5 10 and 1 hours)	0	0
Moderately far (between 1 and 2 hours	80	95
Far(More than 2 hours)	20	0
Distance	Frequency(%) by status in production network	
	OUT	IN
Near Port(less than 10Km)	0	2.8
Moderately near(between 10 and 30Km)	15.6	27.8
Moderately far (between 30 and 45Km)	28.9	27.8

Third, the SMEs in production networks receive more bank loans than those that are outside. Although in general the SME relies primarily on internal financing, the SMEs in production networks do receive some bank loans. Bank loans account for 23% of total working capital financing for SMEs in networks, compared to 12% for SMEs outside networks. For capital expansion, the share of bank loans is 4.8% and 2.4% for SMEs inside and outside networks respectively (see table 7). As result, the SMEs in

networks pay a little more in interest than those that are outside as table 8 shows (see table 8).

Table 7. SME Funding Sources

Production Net: Working Capital：

	Frequency(%) by status in production network	
	OUT	IN
Funding source: Retained earnings	62.5	46.74
Funding source: bank	12	22.67
Funding source: other financial institutions	2.77	3
Funding source: other(gov't assistance, informal source, etc.)	50.2	18

Production Expansion / Capital Expansion

	Frequency(%) by status in production network	
	OUT	IN
Funding source: Retained earnings	62.1	54.56
Funding source: bank	2.43	4.79
Funding source: other financial institutions	1.34	2.98
Funding source: other(govt assistance, informal source, etc.)	21	20

Table 8. SME Interest Cost

	Frequency(%) by status in production network	
	OUT	IN
ICR1(ICR less than 11.5)	57.1	66.7
ICR2(ICR between 11.5 and 25)	19.0	16.7
ICR3(ICR between 25 and 71.4)	4.8	5.5
ICR4(ICR more than 71.4)	19.1	11.1
	Frequency(%) by status in production network	
	OUT	IN
Intsh1(Intsh less than 1%)	42.9	36.8
Intsh2(Intsh between 1% and 5%)	57.1	57.9
Intsh4(Intsh more than 5%)		5.3

The performances of SMEs in networks is better than those that are outside, if the performance is measured by labor productivity. The proportion of SMEs whose labor productivity is higher than 23.8 is 64.3% for those in networks and 50% for those who are not. (see table 9)

Table 9. SME Labor Productivity

	Frequency(%) by status in production network	
	OUT	IN
LP1(LP less than 3.7)	3.4	0
LP2(LP between 3.7 and 8.9)	10.4	9.5
LP3(LP between 8.9 and 23.8)	36.2	26.2
LP4(LP more than 23.8)	50	64.3

The improvement of existing machinery and facilities and the introduction of new products seem to constitute no constraint for SMEs' participation in production networks, evidenced by table 10. The table shows that a higher percentage of those outside networks improved existing machinery and facilities. For introduction of new products, the percentage of those inside is just slightly higher than those outside. (see table 10)

Table 10. SME Technology Characteristics

	Frequency(%) by status in production network	
	OUT	IN
Has improved existing machinery and facilities	80.5	55.2
Has not improved existing machinery and facilities	29.5	44.8
	Frequency(%) by status in production network	
	OUT	IN
Has introduced new products last 3 years	68.5	70.7
Has not introduced new products last 3 years	31.5	29.3

The descriptive statistics seem to suggest that industry, location, financial channel and labor productivity are positively linked to the participation of SMEs in production networks, while the improvement of existing machinery and facilities and introduction of new product are not.

3.4. Identifying the Constraints for Participating in a Production Network: Results from Econometric Analysis

A probit regression is made to further test the relationship between participation in networks and factors inferred by descriptive statistics.

The regression results (see table 11) show that the industry of the SME is a very strong factor in the probability of participation of an SME in a production network. More specifically, if the SME is in the auto industry, its probability of participation in a network is much higher than otherwise.

The regression also tends to suggest that the size, degree of government ownership, performance, and skill intensity of an SME are all positively related to the probability of participation, as the coefficients of these variables are positive. However, these relationships are not very reliable, because they are not statistically significant at the 10% confident level. The suggested relationships are consistent with common sense.

The regression also shows that the distance to port and share of interest in total cost are negatively related to the probability of participation. The distance variable is also not statistically significant, while the interest variable is. This result may suggest that financial constraints are more prominent for SMEs outside networks. Or, in other words, the participation of an SME in a network may mitigate the financing difficulties faced by SMEs in general.

For the variables of technological readiness of the SME, the regression found that involvement in a business network; acquisition of new machinery and acquisition of production knowledge are positively related to the probability of participation. And the relationships are statistically significant. This suggests that the SME really does need to prepare itself before it can participate in a production network.

Table 11. Regression Result: Participation in Production Network

Independent Variable	Dependent Variable: (Participation in Production Network)		
SIZE	0.001	0.001	0.001
	(0.53)	(0.52)	(0.49)
AUTO	1.33	1.43	1.31
	(3.7)***	(3.85)***	(3.7)***
GOV	0.28	0.69	0.51
	(0.27)	(0.69)	(0.52)
LP	0.005		
	(1.254321)		
Profit		2.16	
		(1.24)	
growth			0.07
			(0.95)
SI	0.08	0.10	0.11
	(0.22)	(0.26)	(0.28)
C	-0.959	-1.066	-0.838
	(-2.45)**	(-2.53)**	(-2.25)**
Wald Chi^2	18.45	18.38	17.7
McFadden R^2	0.145	0.145	0.140
Observations	97	97	97

*** significant 1%

** significant at 5%.

* significant at 10%

Remark: Absolute value of z statistics in parentheses.

Independent Variable	Dependent Variable: (Participation in Production Network)		
Size	0.004	0.003	0.002
	(0.759)	(1.269)	(0.037)
Labour productivity	0.002	0.004	0.007
	(0.176)	(0.038)	(0.574)
Interest Coverage Ratio	0.005		0.018
	(0.221)		(0.693)
Share of interest payment in total cost		-0.131	
		(-1.744)*	
Distance to port			-0.624
			(-1.205)
Skill intensity	0.754	1.995	0.941
	(0.765)	(1.819)*	(0.871)
Constant	-1.051	-0.390	-0.384
	(-1.100)	(-0.463)	(-0.351)
Wald Chi^2	4.56	10.18	3.66
Mcfadden R^2	0.14	0.29	0.13
Observations	24	25	20

Independent Variable	Dependent Variable: (Participation in Production Network)							
size	0.004 (1.658)	0.003 (1.242)	0.003 (1.469)	0.002 (1.023)	0.002 (0.989)	0.004 (1.593)	0.002 (1.029)	0.003 (1.282)
Labour productivity	0.003 (0.498)	0.004 (0.694)	0.004 (0.761)	0.009 (1.392)	0.003 (0.628)	0.003 (0.587)	0.004 (0.693)	0.004 (0.764)
Skill intensity	0.204 (0.406)	0.401 (0.678)	0.339 (0.631)	0.339 (0.556)	0.278 (0.559)	0.262 (0.494)	0.283 (0.545)	0.372 (0.687)
Dummy variable for meeting international standard	-0.748 (-1.573							
Dummy variable for have introduced ICT		0.110 (0.283)						
Dummy variable for have established new division			-0.337 (-0.831)					
Dummy variable for involving in business network				1.379 (2.589)*				
Dummy variable for acquiring new machinery					0.671 (1.617)*			
Dummy variable for improving existing machinery						-0.719 (-1.325)		
Dummy variable for acquiring production knowledge							0.788 (1.846)*	
Dummy variable for ability of introducing new products								0.161 (0.411)
Constant	0.256 (0.415)	-0.439 (-0.721)	-0.266 (-0.469)	-1.548 (-2.005)	-0.635 (-1.174)	0.237 (0.329)	-0.784 (-1.410)	-0.458 (-0.799)
Wald Chi^2	6.68		5.25	11.06	6.73	6.32	7.94	4.43
Pseudo R^2	0.10		0.08	0.17	0.10	0.10	0.12	0.07
Observations	53		51	51	53	53	52	52

3.5. Identifying the Constraints for SMEs Engaging in International Business: Results from Econometric Analysis

We regard the SME as "international" if it answers "yes" to at least one of following 3 questions. One is if there is any foreign share in its ownership, the second is if any input of the SME comes from abroad, and the last one is if its product is for export. In our sample, there are 14 SMEs, or 14% of the total surveyed, that we regard as "international". The constraints that may limit SMEs engaging in international business will be identified by a discrete dependent variable model. In the case of this survey, the dependent variable is whether the SME can be regarded as international, as we defined. The value of these dependent variables either 1, integrated, or 0, not integrated. So, more specifically, a binary model is used. We tested quite a large number of variables,

both numeric and qualitative, and we report the variables as significant as follows. The model's statistical results are presented in table 12. (see table 12)

Table 12. Regression Result: Factors for SME Internationalization

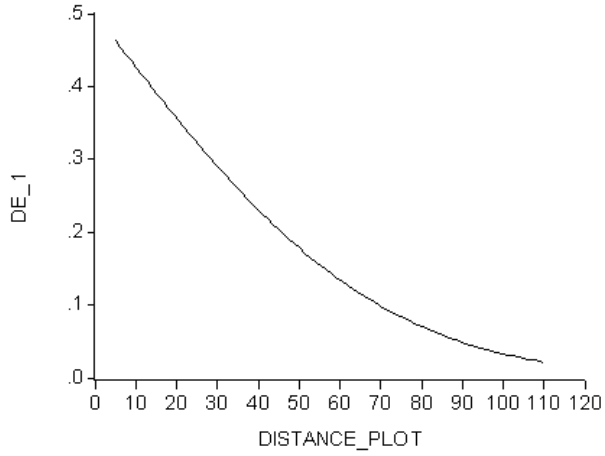
Independent Variables	Dependent Variable: go international or not			
C	-1.102	-2.077	-2.095	
	(-2.901)	(-3.200)	(-3.271)	
Within industrial park	0.278	0.972	0.735	
	(0.465)	(2.552)	(2.05)	
Staff with tertiary degree	0.002			
	(0.111)			
Size of SME		0.198		
		(1.246)		
Type of industry			0.271	
			(1.431)	
Distance to port				-0.0184
				(-5.390)

Perception of Constraints to SMEs

3.5.1. Location

The model demonstrates that the location of an SME, measured both by if it is located in a development zone and its distance to a major sea or air port is significant in explaining whether or not it is "international". The distance clearly relates to transportation cost and its significance is expected. From the figure 5, we can see that that longer distances decrease the probability of a SME being integrated.

Figure 5. Probability Distribution of SME Integration by Distance

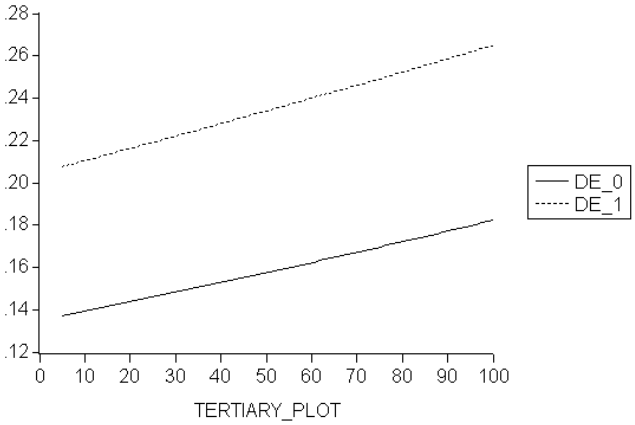


Development zones are strong factors in deciding the value of a dependent variable. In China's case, development zones usually provide better business services and good opportunities for SMEs to build their connections with other enterprises. We include this variable in different models to check if other variables are still significant under controlled situation.

3.5.2. Educational Attainment

The model confirmed that the educational attainment of employees is significant for the internationalization of an SME. The figure shows that the higher the percentage the staff with a tertiary degree, the higher the probability that an SME is integrated internationally. Location in a development zone again increases the possibility of internationalization. (see figure 6) The perception data in the questionnaire reconfirmed the importance of the quality of employees, as SMEs cite the lack of qualified personnel as the single most important reason for their enterprise failing to grow.

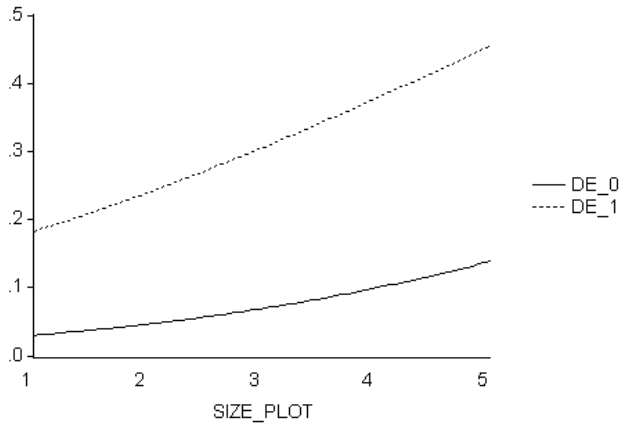
Figure 6. Probability Distribution of SME Internationalization by Percentage of Staff with Tertiary Degree



3.5.3. Size of SME

The model reveals that the size of an SME is positively related to the probability of internationalization. The bigger the SME, the higher the probability (see figure 7). The bigger SME is more often than not better equipped and technologically advanced, enabling it to meet international standards.

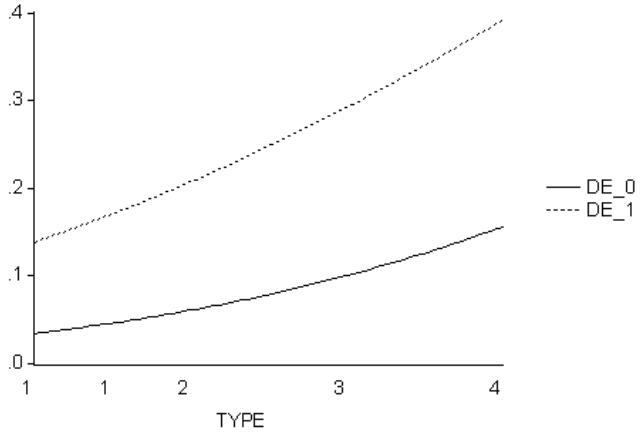
Figure 7. Probability Distribution of SME Internationalization by Size



3.5.4. Industry

The model shows also that the industry of an SME affects the likelihood of it being integrated internationally. The apparel industry has the least probability of integration. The electronics and auto industries have a higher probability of integration. However, the industries other than apparel, electronics and auto, among them there are quite a large number of technology enterprises, has the highest probability of international integration. (see figure 8) This conclusion may not hold true nation-wide. In Tianjin, the strong presence of foreign electronics giants, such as Motorola and Samsung, may help explain this conclusion.

Figure 8. Probability Distribution of SME Internationalization by Type



Note: Type 1, 2, 3, 4 denote apparel, electronics, auto and other industry respectively.

3.5.5. Brief Conclusion

The model concluded that the location of an SME, its training efforts, the size of the SME and its industry are all significant to the probability of its internationalization. While we also tested the variables relating to business potentials and assistance received, we didn't find them significant.

3.6. Identification of the Constraints from Perception Data

Figure 9 show that product and price barriers, the functional barrier and the information barrier are the most important factors that hinder the integration of an SME into an international production network. The proportion of SMEs who rated the importance of the three barriers mentioned above as being above 3 on an 8 point scale are 72.1%, 57% and 53.5% respectively for the barrier of product and price, the functional barrier and the information barrier. (see figure 9)

Figure 9. Proportion of SMEs who rated the Importance of a Barrier at above 3 on an 8-point Scale

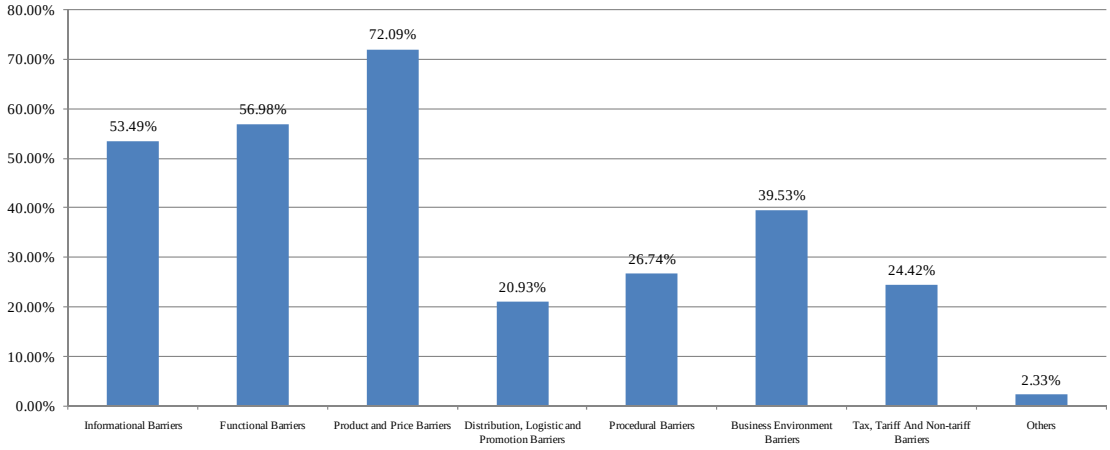


Table 13 produced a similar result using different measures. However, table13 reveals the differences in perceived barriers between those inside and outside production networks. Those in the networks put the barrier of the business environment ahead of the information barrier, while those outside did the opposite. This suggests that joining a network may help an SME to overcome the information barrier; while, on the other hand, it may expose the SME to a foreign business environment that it finds difficult to handle. (see table 13)

Table 13. Ranked SME Constraints by Category

rank	Total	in	Out
1	product and price	product and price	information
2	Information	business environment	functional
3	Functional	functional	product and price
4	business environment	information	distribution, logistics
5	distribution, logistics	procedural	business environment
6	Procedural	tax, tariff and non-tariff	procedural
7	tax, tariff and non-tariff	distribution, logistics	tax, tariff and non-tariff
8	Other	other	Other

Looking into the details, the barriers in subcategories that the SMEs thought the most important are 1-insufficient quantity of and/or untrained personnel for market

expansion, 2-shortage of working capital to finance new business plans, 3-lack of production capacity for expansion, 4-lack of managerial time to identify new business opportunities, 5-difficulty in getting credit from suppliers and financial institutions, 6-developing new products, 7-adapting to demanded product design/style, 8-difficulty in matching competitors' prices, 9-anti-competitive or other informal practices. The proportions of SMEs who thought the importance of the above barriers was above 2 on a 5 point scale vary from 10% to 40%. (see figure 10)

Figure10. Proportion of SMEs who rated the Importance of a Barrier at above 2 on a 5-point Scale

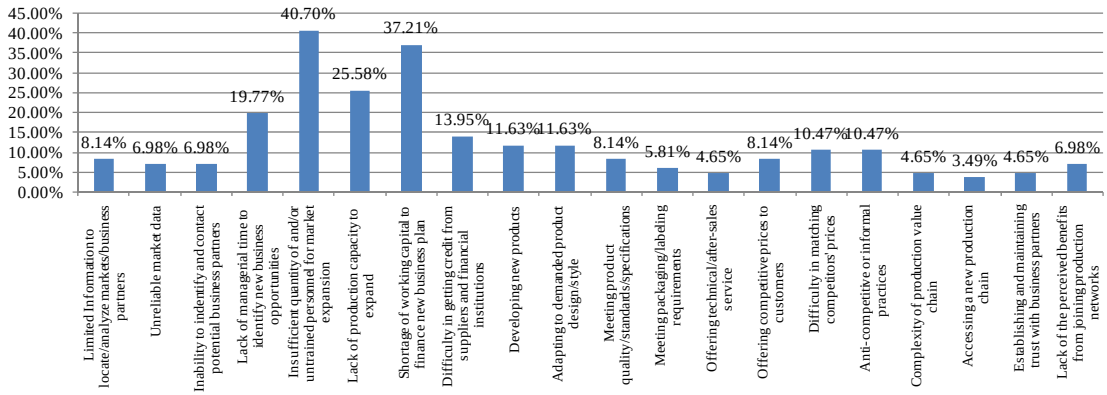


Table 14 reveals the difference in constraints perceived by those inside and outside networks. Not surprisingly, those in a network found the high cost of customs administration in exporting or importing to be the most significant constraint for them, followed by high taxes and tariffs in foreign markets. Those outside networks, however, believed the lack of qualified staff and access to financing were the most significant constraints. The difference suggests that joining a network significantly changed the environment of the SME's operations. The SME has to face quite different problems after joining a network. (see table 14)

Table 14. Ranked Top-ten Constraints Faced by SMEs (Mean)

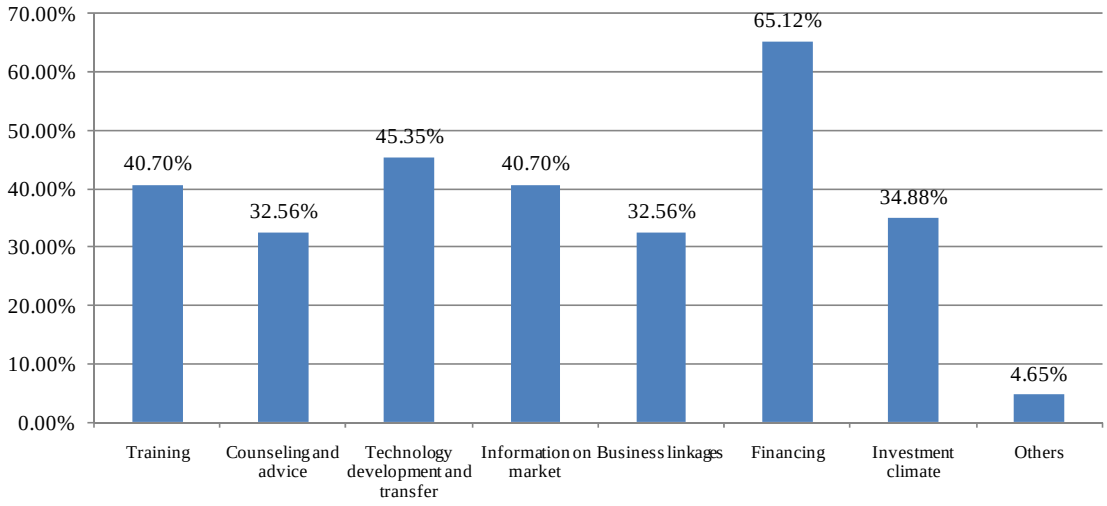
Rank	All sample	Production net	
		In	Out
1	B5 insufficient quantity of and /or untrained personnel for market expansion	B34 high costs of customs administration in exporting or importing	B5 insufficient quantity of and /or untrained personnel for market expansion
2	B7 shortage of working capital to finance new business plan	B31 high tax and tariff (foreign)	B7 shortage of working capital to finance new business plan
3	B31 high tax and tariff (foreign)	B32 inadequate property rights protection(home)	B6. Lack of production capacity for expansion
4	B6. lack of production capacity to expand	B31. high tax and tariff barriers(home)	B8. Difficulty in getting credit from suppliers and financial institutions
5	B34 high costs of customs administration in exporting or importing(foreign)	B34. high costs of customs administration, in exporting or importing(home)	B9. Developing new products
6	B32. inadequate property rights protection (home)	B33. restrictive health, safety and technical standards (home)	B4. Lack of managerial time to identify new business opportunities
7	B35. perceived risks in your current and new business operations	B28. poor/deteriorating economic conditions(foreign)	B35. Perceived risks in your current and new business operations
8	B28. poor/deteriorating economic conditions(foreign)	B5 insufficient quantity of and /or untrained personnel for market expansion	B10. Adapting to demanded product design/style
9	B31. high tax and tariff barriers(home)	B7. shortage of working capital to finance new business plan	B31. High tax and tariff barriers(foreign)
10	B33. restrictive health, safety and technical standards (home)	B23. unfamiliarity with complexity of procedures/paperwork	B1. Limited Information to locate/analyze markets/business partners

4. Policy Implications

Based on the survey, policy needs to address both the barriers that the SMEs thought most important to their business development and the assistance that SMEs think most needed. We have already shown that the most important barriers are product and price, function and information.

The most needed assistance is financing, as more than 65% of SMEs rate it at least above 3 on an 8 point scale. The next most important kinds of assistance are technology development and transfer, training and market information. (see figure 11)

Figure 11. Proportion of SMEs who rated the Importance of Assistance at above 3 on an 8-point Scale



The SMEs inside and outside networks have minor differences in the assistance they most desire, as table 15 reveals. Those in networks thought that financing was most important, while those outside chose training. The choice of training as most important is consistent with the barrier perception of SMEs outside networks, who thought the lack of qualified staff was their most significant barrier. Those in networks who chose financing as the assistance they most wanted may have done so because the questionnaire offered no option in relation to their top difficulty, namely the high cost of customs administration in exporting or importing. (see table 15)

Table 15. Ranked Perception of Assistances to SMEs by Degree of Importance

Rank	All Sample	Production net	
		In	Out
1	Financing	financing	training
2	technology development and transfer	technology development and transfer	technology development and transfer
3	Training	information on market	information on market
4	information on market	training	counseling and advice
5	counseling and advice	counseling and advice	financing
6	business linkages and networking	overall improvement in investment climate	business linkages and networking
7	overall improvement in investment climate	business linkages and networking	overall improvement in investment climate
8	Others	others	others

Based on both barriers and the assistance wanted, we believe that policy should focus on the following aspects:

4.1. Improving SME Access to Financing

The survey reconfirmed that SMEs in China still lack access to the financing they need. Internal financing is almost the only channel for SME financing, thus limiting the SMEs' rate of growth. However, improving the access of SME to financing in China is a daunting challenge, as the banking sector is dominated by big state banks. Cost-effectiveness does not favor the SMEs as the transaction cost for making loans to SMEs is disproportionately higher than making loans to big business. Another problem is linked to the predominately private ownership of small business. The employees in a state owned bank may find themselves in a difficult position if a loan to an SME is in default. The lack of risk information about SMEs also contributes to their financing predicament.

To address the above problems, a multi-pronged approach is needed. First, China should proceed with its financial reform to allow small financial institutions to play a bigger role. Based on their comparative advantage, small financial institutions are more suitable for providing financial services to SMEs. Second, China needs to further open its financial market to the private sector to better serve the privately-owned SMEs. Third, to mitigate the risk associated with SME loans, the government-sponsored loan guarantee program needs to be further expanded, and a credit information collection and publication system needs to be put in place to help financial institutions properly price the risks. Fourth, China needs to further expand direct financing for SMEs. Recent moves, such as the launching of an SME and venture board in the stock market marks a obvious progress in this direction. However, more efforts are still needed in the

corporate bond market and the capital market for non-listed SMEs.

4.2. Strengthening SMEs' Business Capability

The lack of adequate business capability in both technology and human resources constitutes a prominent barrier to SMEs' growth, and their integration into international production networks. The public technology service system needs to be strengthened. This system should, on the one hand, provide a platform to help SMEs to upgrade their technology and products to meet international standards. On the other hand, the system should help the transfer of technology to SMEs to sharpen their competitive edge. The availability of qualified staff is also a crucial factor for SMEs' growth, and most SMEs suffer from a shortage of qualified staff. There are several policy options to address this problem. First, a better professional service system for SMEs needs to be developed. In China, a social service system for SMEs has been created. One example is Tianjin's SME service center, which helped to conduct this survey. The next task is to make the service system more effective. Second, more training should be offered to improve the management, and especially marketing, skills of SMEs. Third, policy to encourage entrepreneurship of college graduates should be strengthened.

4.3. Modernizing Information Services for SMEs.

The lack of market information is a problem that an SME has to face on a daily basis. The traditional way to address this problem is costly. However, e-commerce provides a unique opportunity for SMEs to leapfrog. Efforts need to be made to improve the IT literacy of SMEs, and incentives to encourage SME investment in IT hardware needs to be in place. The e-commerce sector also plays a very important role in improving information services to SMEs. Alibaba, the biggest e-commerce company in China,

who offer a platform for business to benchmark each other, claims to target SMEs specifically. Policy is also needed to assure a sustained growth in e-commerce.

4.4. Better Usage of Development Zones to Boost Integration of SME s into International Production Networks

As the survey suggested, a development zone can serve as a strong catalyst for SMEs to integrate into international production networks. The development zone usually provides better professional, technological, and information services, and also sound infrastructure. And even more importantly, the SMEs located in development zones can build good connections with other SMEs and big businesses, increasing their chances of integration into production networks. And in China, enterprises in development zones usually enjoy favorable policy. It would be very much to the benefit of SMEs to concentrate in development zones. In China's situation, policy coordination and tax arrangements at local government level are crucial to achieve the concentration of SMEs in development zone. More effort is needed in this area.

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✧ **Website**

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