

G-COMMERCE IN EAST ASIA: EVIDENCE AND PROSPECTS

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Abstract: Online games are viewed as the killer application service of electronic commerce, and it arouses the question for businesses and government as how to develop the online game market. This exploratory paper examines the causes behind the exponential growth of online games in East Asia. The results show that South Korea and Taiwan are leading all others in PC-based online gaming, because of their easy and low-priced broadband access. Japan, on the other side of the spectrum, has leaned toward mobile games, as 44.9 percent of Japanese use the mobile Internet and play wireless games on their palm-sized gadgets.

This paper begins with observations on the online game market in these countries, respectively. It then asserts two developmental paths of online games: web-based PC games and mobile games. The author also identifies three structural factors that contribute to online game development, namely: (1) the substitution effects between fixed-line and mobile communications, (2) easy access to Internet cafés, and (3) the substitution effects between console and PC games. The analysis prepares researchers to answer the questions of whether or not could this growth be replicated elsewhere, and which developmental model will be absorbed. The findings show that North American countries have a greater likelihood to expand the market of PC-based online games due to their structural resemblance to South Korea and Taiwan. The European countries as exemplified by the United Kingdom on the other hand may opt for the wireless game model. Undoubtedly, the information infrastructure is a determinant in the growth of online games, and policy measures from the government may help the presence of a well-established infrastructure.

Ever since video game cassettes came onto store shelves nearly three decades ago, the game market has grown in an unprecedented fashion to exceed the film market. Table 1 shows the global market of games from 1998 to 2004. In addition to console and arcade games, online games recently evolved to become a new territory due to improved information and computer technologies (Cole 2002). Online games, with an average 40 percent growth rate, have become the fastest growing segment and the second largest one within the whole market. Forecasts predict an increase of 18 million online gamers in 2003, with the number reaching 114 million worldwide by 2006 (DFC Intelligence 2002). Online games have been viewed as the killer application service for e-commerce, and the term "g-commerce" is used to describe the escalating market of online games.

Table 1. Global Game Market, 1998-2004 (unit: US\$ million)

	1998	1999	2000	2001	2002	2003 (F)	2004 (F)
Console Games	14,135	14,837	13,526	18,461	21,295	23,398	24,461
Arcade Games	1,776	2,008	2,345	2,735	3,156	3,602	3,937
PC Games	2,388	2,644	2,871	3,024	3,187	3,396	3,536
Online Games	803	1,004	1,476	2,078	3,003	3,912	4,521
Total	19,102	20,493	20,218	26,298	30,641	34,308	36,455

(F): predication value
Source: (MIC 2003)

The term "online games" contains a hybrid of game types. Divided by the user's interface, online games could be web-based PC games, wireless games (mostly mobile-handset based), or interactive TV games, but the term is often restrained to the web-based PC games since the last two types are less popular. The PC online gamers usually refer to those who play games as least 20 hours per month and play the games at a high skill level, such as role playing (RPG), strategy, fighting, or shooter games (Chronis 2002). This hard-core group, predominated by males, is the major customer base for the massively multiplayer game (MMP) (IGDA 2003, p. 21).

Demographically, Asia represents the biggest market for online games. According to a recent IDC research report, online gamers amounted to 22 million in 2001, of which 55 percent were located in Asia (Olhava 2002). Up until the end of 2002, South Korea, Taiwan, and mainland China were the top three markets for online games, each accounting for 54, 26, and 16.8 percent share of the g-commerce value worth \$533 million U.S. (MIC 2003). Japan, instead of focusing on the PC online games, becomes the largest community of wireless games (IGDA 2003).

Although online games have grown exponentially in East Asia, this paper observed two developmental paths among the countries, as shown by the web-based PC games in South Korea and Taiwan, and by the wireless games in Japan. For scholars, it is imperative to probe the reasons behind the different developments of online games and predict their

changes. At a time when the other two major game markets in North America and Europe are expanding into the online game territory, the Asian experiences may shed light on the progress of g-commerce in other regions. This paper begins with the delineation of the Asian development of g-commerce, and then analyzes the factors that sustain it. With these cases closely examined, it can be determined whether or not the Asian experiences could be replicated elsewhere and which developmental model would be applicable in North America and Europe.

DIAGNOSIS OF ONLINE GAMES IN ASIA

South Korea & Taiwan

For the 2002 Asian market, South Korea claimed a 54.3 percent share and the Greater China area (mainland, Hong Kong, and Taiwan) comprised 45.2 percent (Olhava 2002). Table 2 shows the online game markets in South Korea as well as Taiwan since 2000. South Korea has thus far been the largest online community around the world. Its 9.5 million online gamers represent 20.1 percent of the population, 36.2 percent Internet users, or equivalent to 93.8 percent broadband adopters. As for Taiwan, its market in 2002 reached over \$76 million U.S., and is expected to grow by 60 percent annually in 2003 (MIC 2003). Students between the ages of 12 and 22 comprise the largest segment of players in Taiwan, and over 50 percent of the island's Internet users (about 4.5 million) either occasionally or habitually play web-based video games (see Table 2).

Table 2. The Online Game Market in South Korea and Taiwan

		2000	2001	2002
South Korea	Market value (US\$ million)	48.45	103.77	130.17
	# of players (thousand)	4,500	7,500	9,500
Taiwan	Market value (US\$ million)	13.92	49.48	76.68
	# of players (thousand)	600	3,000	4,500

Source: NC Soft (<http://www.ncsoft.net>); MIC (<http://mic.iii.org.tw>)

Popular game categories are action, fighting, and RPG, but the South Korean online gamers mostly play RPG-type MMP. A popular game site usually hosts approximately 300,000 players on line simultaneously during the high peak period (Chen 2001). Unlike the CD-based PC game, the web-based MMP is a permanently existing and ongoing service that allows players around the world to log in and play anytime (IGDA 2003). In the Internet sense, the interaction between players and with the Game Master makes the MMP more identical to a virtual community, resulting in the development of online game

models. For instance, the hosting websites are run as the commercial portal to integrate customized services, e-news, e-commerce, banner advertisements, and so on, as a part of the game service. In addition to the game-playing charges, another stream of revenue comes from the gamers' purchase of in-game objects and the placement of in-game events (e.g., in-game wedding ceremonies) (IGDA 2003). Some software developers are even considering a plan to run a theme park based on their game characters (Lai, Chin, and Chang 2003).

Table 3 lists the top five MMPs played in South Korea and Taiwan. Lineage is certainly the most popular title over the years, registering as many as 4 million members at its peak. The success of this title enabled its production house, NC Soft, to claim a high profit of \$43.57 million U.S., equivalent to a 42 percent share of the domestic market (see Table 4). Its oversea distributors, such as Gamania in Taiwan, also make up over a 50 percent share of the local market.

Due to its similar culture with South Korea and the lesser quality of its games software, the publishers of Taiwan have been left no choice but to import South Korean MMP games. Table 3 also shows that three out of the top five MMP games in Taiwan are South Korean-made. Not only does South Korea consist of the largest domestic online-game market around the globe, but it is also the largest exporter of online games. Taiwanese production houses did not start to offer their PC games online until 2001.

Table 3. The Top Five MMP Games and Their Publishers/Distributors

		1	2	3	4	5
South Korea	2001	<i>Lineage</i> (NC Soft)	<i>Ragnarok</i> (Gravity)	<i>Asgard</i> (Nexon)	<i>Legend</i> (Actoz)	<i>Fortress 2 Plus</i> (CCR)
	2002	<i>Lineage</i> (NC Soft)	A3 (Actoz)	<i>Ragnarok</i> (Gravity)	<i>Asgard</i> (Nexon)	n/a
Taiwan	2001	<i>Lineage</i> (Gamania)	<i>Stone Age</i> (WaYi)	<i>Dragon Raja</i> (Acer)	<i>Cross Gate</i> (JoyPark)	<i>Battle Net</i> (Soft World)
	2002	<i>Lineage</i> (Gamania)	<i>Ragnarok</i> (Soft World)	<i>Jin Yong</i> (Soft World)	<i>Cross Gate</i> (JoyPark)	<i>Stone Age</i> (WaYi)

Source: Liberty Times (<http://www.libertytimes.com.tw>); iNews24 (<http://www.inews24.com>); Bahamute (<http://www.gamer.com.tw>)

Japan

Ever since NTT DoCoMo launched its i-mode service in February 1999, millions of Japanese have accessed the Internet, surfed the web, chatted online, and received emails via their mobile phone handset. So far, 45 percent of Japanese access the Internet via their mobile devices, and mobile accessing occupies 72.2 percent of all means of access to the Internet (see Table 4) (MPHPT 2003). Consequently, mobile (wireless) games are more popular than online PC games in Japan. It is

estimated that the mobile game market in Japan is flourishing with revenues of \$100 million (DFC Intelligence 2002).

Table 4. Mobile Subscribers and Internet Usage, 2002 (unit: thousand)

	Japan	S. Korea	Taiwan	UK	Canada	U.S.
Mobile subscriber lines	79,083.3	32,342	23,905.4	49,921	11,829	140,766.8
Mobile Internet users	57,100	16,971	1,070	3,192	1,499	10,141
Percentage using mobile Internet	72.2	52.5	4.5	6.4	12.7	7.2
Penetration rate of mobile Internet	44.9	35.9	4.7	5.4	4.9	3.6

Source: ITU (<http://www.itu.int>); DGT (<http://www.dgt.gov.tw>)

Taking the example of i-mode services, 20 percent out of its 3,532 official sites are game related and mobile games have earned DoCoMo a 11.5 percent share of the total revenues in the fiscal year 2000 (The Internet Untethered, 2001). Wireless games are often connected and played through short message service (SMS) or enhanced message service (EMS). The popular SMS/EMS games are time-killer ones such as "virtual boyfriend/girlfriend," "wireless pets," or classical card/puzzle ones like Tetris, Solitaire, Hangman, and Blackjack (Fun on the Run, 2002). Unlike MMP gamers, the mobile players utilize only the transportation time to play an easy and quick game (IDGA 2003). Until recently, the positioning function inherent in mobile communications has been incorporated into SMS games to make the location-based/SMS hybrid game available. This game is thus area specific and allows gamers to interact with the living environment. For example, the popular Botfighters is a shooter game in which the host with the positioning system sends short messages to the gamer about the distance of others so that he can send the shooting message back to the system once the opponent is located in his shooting area (Strong Players, 2002).

Foundations of the Online Game Development

As depicted in the above section, South Korea/Taiwan and Japan demonstrate two divergent paths of online game development. The question left to consider is what factors could account for such divergence. To universalize the developmental experiences, most literature employs cross-country studies to partition out the socio-political structure within which a country's development is embodied. This paper adopts the macro approach to examine the structural constraints by which the online game developments in Asia differ. As online games are viewed as the killer application service for e-commerce, the Internet infrastructure supposedly plays an important role in developing e-entertainment

services. Intensified competition within the game industry also complicates the development of online games. Then three aspects of the infrastructure/industry are examined: 1) the substitution effects between the fixed-line and mobile communication networks; 2) easy access to Internet cafés; and 3) the substitution effects between console games and online games.

1. The fixed-line vs. mobile communication networks

Game consultants often associate the PC-based online game market with broadband penetration as well as widespread Internet cafés. Indeed, the cases of South Korea and Taiwan confirm this scenario. Table 5 shows that South Korea surpasses all others for its broadband penetration rate of 21.3 percent, with 38.5 percent of the Internet population. In Taiwan, 24.4 percent of Internet users have broadband access although they constitute only 9.4 percent of the population. In addition, both the broadband tariffs in South Korea and Taiwan are sufficiently low so as to stimulate the demand for broadband connectivity and consumers' willingness to migrate to broadband access from dial-up connection (see Table 5).

In contrast to the high penetration rate of broadband access in South Korea, Japan demonstrates a case with a low broadband penetration rate but the highest percentage (72.2 percent) of mobile Internet usage in the world (see Table 4). For Taiwan, it has not yet followed in Japan's path by which the mobile game market has thrived, even if the island is ranked at the top in mobile penetration (106.5 subscribers per 100 inhabitants in 2002). Regrettably, about 1 million mobile users subscribed to the GPRS or WAP service also, accounting for only 4.5 percent of the mobile phone population.

Table 5. Broadband Connectivity and its Tariff (unit: thousand)

	2000.12		2001.12		2002.12	
	Subscribers (Penetration rate)	Monthly fee (US\$/operator)	Subscribers (Penetration rate)	Monthly fee (US\$/operator)	Subscribers (Penetration rate)	Monthly fee (US\$/operator)
Japan	635 (0.5)	52.12 (NTT)	2,839 (2.2)	23.50 (Yahoo J)	7,806 (6.1)	29.15 (NTT)
S. Korea	5,426 (11.5)	34.23 (KT)	8,146 (17.2)	37.29 (KT)	10,128 (21.3)	36.06 (Hanaro)
Taiwan ^A	115 (0.5)	19.80 (CHT)	920 (4.1)	18.34 (CHT)	2,100 (9.4)	20.69 (CHT)
UK	58 (0.1)	77.19 (BT)	350 (0.6)	60.01 (BT)	752 (1.3)	67.44 (BT)
Canada	1,392 (4.4)	27.76 (BC)	2,730 (8.8)	29.64 (BC)	3,600 (11.5)	34.00 (BC)
U.S.	6,009 (2.1)	39.95 (Verizon)	12,783 (4.5)	49.95 (Verizon)	18,700 (6.5)	38.91 (SBC)

^A: data through to June 2002; ^A: the tariff is estimated on 512K DSL service
 Source: OECD (2003a); FIND (<http://www.find.org.tw>); ITU (<http://www.itu.int>)

In this sense, it is hypothesized that the substitution effects between the broadband access and mobile access to the

Internet that constitute the development of online games. The substitution effects are manifested by two indicators that explain: (1) the ratio of DSL subscribers to all the Internet users; and (2) the ratio of the penetration rate of mobile Internet users to that of DSL subscribers. Table 6 lists the percentage of the access to the Internet via the DSL technology and the number of DSL lines in all local main lines. South Korea and Taiwan double the numbers compared with Japan. That is, more than twice the number of South Korean and Taiwanese Internet users adopt broadband technologies as Japanese do. When more users retrieve the Internet content through the fixed-line network, it is more likely that they would be inclined to use the PC-based online games.

Table 6. Internet Users and DSL Access, 2002 (unit: thousand)

	Local access main lines (A)	Internet users (B)	DSL access lines (C)	Percentage of access to Internet via DSL (C/B)	Percentage of DSL in local access (C/A)
Japan	74,567	57,200	5,645.7	9.9	7.5
S. Korea	23,257	23,114	5,381.6	23.3	23.1
Taiwan	13,099.4	8,590	1,920	22.4	14.7
UK	35,290	24,000	552	2.3	1.6
Canada	19,962.1	15,200	1,726.4	11.4	8.6
U.S.	190,000	155,000	6,471.7	4.2	3.4

Source: OECD (2003a); FIND (<http://www.find.org.tw>); ITU (<http://www.itu.int>)

Table 7 compares the penetration ratios of mobile Internet to DSL. The ratio of 7.36 in Japan's case means that, for a Japanese who utilizes DSL technologies, 7 persons at the time decide to access to the Internet content via mobile devices. On the contrary, the number of mobile Internet users in Taiwan is only half as much with broadband access. South Korea also has a lower ratio of 1.69, which implies less popularity of wireless content (games) in the region. It is therefore assert that a country, with a higher percentage of DSL technologies within all Internet accesses or a lower ratio of mobile Internet to DSL penetration, would probably utilize PC-based online games. Otherwise, the country would gravitate toward wireless games.

Table 7. Comparison of DSL and Mobile Internet, 2002

	Penetration rate of mobile Internet (A)	DSL Penetration rate (B)	Ratio of mobile/DSL connection (A/B)
Japan	44.9	6.1	7.36
S. Korea	35.9	21.3	1.69
Taiwan	4.7	9.4	0.50
UK	5.4	1.3	4.15
Canada	4.9	11.5	0.43
U.S.	3.6	6.5	0.55

Source: compiled by the author

2. Easy Access to Internet cafés

It is important to note that Internet cafés have grown positively with the popularity of the PC-based online games. As of the end of 2000, there were 12,050 PC bangs (rooms in

Korean) in South Korea. The game publishers often distribute their online titles via the PC bang in addition to web subscription. When the famous Starcraft series was launched, thousands of South Koreans were lured into PC bangs to play that game. It was later called the "Starcraft effect" (Brown 2000). As in South Korea, Taiwan's Internet cafés are the major venues for access to online games. Currently there are approximately a few hundred Internet cafés left on the island, down from a peak of 4,500 in 2001, because of hostile takeovers from corporate institutes to build up PC room chains.

Seoul and Taipei are population-dense cities in which most residences are located side by side. This geo-demographic feature allows for convenient deployment of high-speed fixed-line networks and establishment of Internet rooms with broadband access. An average of 90 percent of residence areas and commercial buildings in Seoul is covered by a broadband network, and Internet cafés are also easily accessible in these cities (KRNIC 2002). According to an OECD report, the coverage rate of DSL lines in Korea is over 70 percent, while the rate in Japan falls below 30 percent (OECD 2003a). The high coverage of broadband networks and widespread deployment of cyber cafés consequently stimulate the playing of the PC-based online games.

3. The console game vs. the PC game market

Console games have thus far constituted the largest portion of the market share and the associated revenues (see Table 1). Table 8 indicates that the console game market is mostly concentrated on the European continent, in the United States, and Asia. Due to its hometown advantage, more than 60 percent of Sony's PS2 boxes in the Asian market are sold locally in Japan (Olhava 2002). Game Boy play stations (GBA) are mostly sold in Japan, too. It is said that the maturity of the console game market will deter players from converting to online games, and Japan's case substantiates the account. On the other hand, South Korea and Taiwan are far behind in terms of expanding the console game market. Indeed, their teenagers were more used to playing PC games since computers reach a higher penetration rate than play stations in the households and the console game titles are priced higher than the PC titles. South Korea and Taiwan may then easily switch to the PC-based online games once the people have broadband access.

Table 8. Sales of Console Hardware Up Through 2002 (unit: thousand)

	Asia	U.S.	Europe	Total
PS2 (Sony)	12,530	21,480	16,020	50,030
Xbox (MS)	850	5,400	1,800	8,200
GBA (Nintendo)	4,920	12,170		17,090

Source: Bahamute (<http://www.gamer.com.tw>)

As far as the user interface is concerned, console hardware such as GBA are made in the similar palm size as mobile handsets. Consequently, Japanese players are more used to switching over between console games and wireless games. It is also observed that NTT DoCoMo made partnerships with Sony and Sega so as to make their arcade or console versions available over mobile handsets. DoCoMo's subscribers could then enjoy playing familiar titles anywhere at any time (DoCoMo in Japanese).

In summary, a country will embark on the track of the PC-based online games if it has a higher penetration rate of broadband access, a lower ratio of the penetration rate of mobile Internet to DSL lines, easy access to cyber cafés, or a smaller console game market. It otherwise may opt for wireless games if the ratio of mobile Internet to DSL penetration is sufficiently high or the console game market is mature enough.

A Unified or Divergent Path?

The formation and augmentation of the online game market in East Asia raises the question of whether or not this phenomenal growth could be replicated elsewhere. As discussed in the previous section, the online game development is indeed attributed to three structural factors: the substitution effects between broadband lines and mobile Internet, easy access to PC rooms, and the substitution effects between console and PC games. Employing East Asia as a benchmark, the development of online games in the European (exemplified by the United Kingdom) and North American regions may be predicted. The question remains of whether the foundations of the online games in East Asia are unique within the Asian countries or even generalizable for other regions to reproduce the same growth pattern? If the answer for latter is positive, then the question that follows is, which developmental model, the PC-based online games or wireless games, will be adopted in those regions?

First of all, as shown by Table 5, the UK consumers suffer from the highest broadband access price (above \$60 U.S.). The

connection fees in the United States and Canada are moderate between \$30-50 U.S. In this sense, the United Kingdom has the lowest penetration rate (1.3 percent) of broadband access, while the United States and Canada have a 6.5 and 11.5 percent broad population, respectively. Table 6 and Table 7 also indicate that the ratio of penetration of mobile Internet to DSL lines for the United Kingdom (4.15) is much higher than that of Canada (0.43) and the United States (0.55). Due to the lower ratio of mobile Internet to DSL penetration rate, it can be plausibly asserted that North American countries with the lower ratio incline to the model of the PC-based online games as demonstrated by South Korea's and Taiwan's cases. Meanwhile, the United Kingdom appears to approach the wireless game model of Japan for its lower penetration rate of DSL lines and its greater ratio of mobile Internet to DSL lines. The European countries are reasonably expected to invest in the wireless game market since they have in average a higher penetration rate of mobile telephony than DSL connection.

As for Internet cafés, they are less easily accessible in both the European and North American countries because of low population density in residences. Finally, it can be seen from the data in Table 8 that both the United States and Europe have a larger installed base of console gamers. The penetration rate of console games per household is nevertheless lower than that of PC hardware. Compared with the number of PC hardware possessed by the U.S. households (1.51) and by the Canadian households (1.03), only 34 percent of these households brought one play station. The United Kingdom is no exception in that its PC penetration rate per household is over 50 percent while that of play stations is less than 20 percent (OECD 2003b). However, the user interface may not be an issue any longer, since the major console game manufacturers, such as Sony, Sega, and Nintendo, plus Microsoft, are now offering console online gaming.

Analyzing the UK and North American cases by the three criteria, it was found that the results proceeded in two different directions. Although the United States and Canada do not enjoy easy access to PC rooms, they do benefit from better-quality and more widespread DSL networks and have a larger installed base of PC users. Consequently, they could follow in South Korea's and Taiwan's footsteps. On the other hand, Europeans are more used to mobile handsets than the Internet-connected computers or play stations, and they do not have easy access to cyber cafés, either. It is more likely that European countries would move toward the Japanese way of playing mobile games. A previous study also produced a similar result to these findings (see Appendix).

Conclusion: Policy Makes a Better Tomorrow

The East Asian countries exhibit two different paths in the development of online games. Their experiences provide others with a clear picture as how to expand the market. A country with high broadband coverage, low connection charges, and easy access to Internet cafés would be better positioned in the PC-based online game market. In contrast, the wireless game market is left for the country with a high penetration rate of mobile communications and a larger installed base of console games. The United States and Canada are subsequently oriented to the former scenario while the European countries are more adapted to the latter.

Although South Korea, Taiwan, and Japan have diverged in their online game development, their successful cases together do point out one common strategy: policy intervention in the market. The East Asian political regimes have a long tradition of pushing strong industrial policies, and this time, no exception is made for the game industry either. In order to uphold their industrial development, the three governments have mandated: (1) construction of a high-speed information infrastructure; (2) tax deduction or subsidies to IT enterprises; (3) an open and competitive telecommunications/Internet market. South Korea has further created innovative policy measures to stimulate the development. For example, PC outlets distribute free or low-priced PCs through governmental subsidies. The government waives mandatory military duties for young men if they are recruited by game companies, and grants extra points to the grades of college entrance exams if the examinees have won a prize in a game contest. Because the typical South Korean housewife manages the family budget and is heavily involved in her children's education, the government under financial support launched computer training programs for 2 million housewives to make them IT savvy (NCA 2002). For the country who desires to grow its online game market, innovative policy measures may be a necessary means of capitalizing on the beneficiary structural factors. The European and North American nations have long adopted an arms-length approach in their regulating on the industry, and now it is time to change.

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APPENDIX

Sinopac Securities has quantified the factors that affect the development of PC-based online games. Table A1 summarizes the factors as follows: i) a high broadband penetration rate, ii) low connection charges, iii) easy access to cyber cafés, iv) a high level of software piracy, v) innovative policy measures to help the game industry grow, vi) a high number of PC gamers, and vii) a small number of console game players. The impact-ranking is divided by a five-point scale as follows: significant (2 points), moderate (1 point), insignificant (0 points), moderately negative (-1 point), and significantly negative (-2 points).

The results in Table A1 confirm that South Korea, Taiwan, and the United States, with a high level of broadband access, low connection charges, PC game popularity, and the smaller penetration of console games, enable the PC-based online game markets to prosper. Japan is not ready yet to develop this online game market because of the low coverage of broadband infrastructure, high connection charges for broadband service, and its high penetration rate of console games.

Table A1. The Competitiveness of the PC-based Online Game

	South Korea	Taiwan	Japan	China	US
High Broadband Coverage	2	1	0	0	1
Low Connection Charge	2	2	0	0	2
Access to Internet Cafés	2	1	0	0	0
Software Piracy	1	1	0	2	0
Policies to Promote the Game Industry	2	0	2	0	2
PC Game Popularity	2	2	1	1	2
Console Game Popularity	-1	-1	-2	0	-2
Total Points	10	6	1	3	5

Note: 2: significant, 1: moderate, 0: insignificant; -1: moderately negative; -2: significant negative impact

Source: Sinopac Securities (<http://www.sinopac.com>)

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