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CAPITAL MANAGEMENT

ALTERNATIVE THINKING ABOUT INVESTMENTS

New China Perspectives

Welcome to the latest issue of Morgan Creek's ***New China Perspectives****. This issue is comprised of research from Morgan Creek's China-based investment team together with curated articles of interest. In addition to timely political and economic news covering greater China, Morgan Creek's China team seeks to provide in-depth perspectives on investing in the technology, consumer and healthcare sectors in the region. Our research leverages the "on the ground" insights of our team together with Morgan Creek's decades-long experience in covering the region. To learn more about our team and investment offerings, please email chinateam@morgancreekcap.com.*

Best Regards,

Mark W. Yusko

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CEO & CIO

NOTES FROM THE BUND[1]

This is the third installment of a five-part series exploring China's dual circulation model. The prior newsletter introduced China's opportunity as it is safeguarding its supply chain. In this newsletter, we will dive deeper into China's path to productivity improvement, through advanced manufacturing and digitalization.

Productivity through services – Digitalization

In the first newsletters, we introduced China's path to becoming a manufacturing superpower. Powered by ownership of the nation's land, China was able to build networks of suppliers, component manufacturers and distributors, which are all key elements in industrial production. The cluster effect combined with low labor costs established cost advantage and the famous label, 'Made in China'.

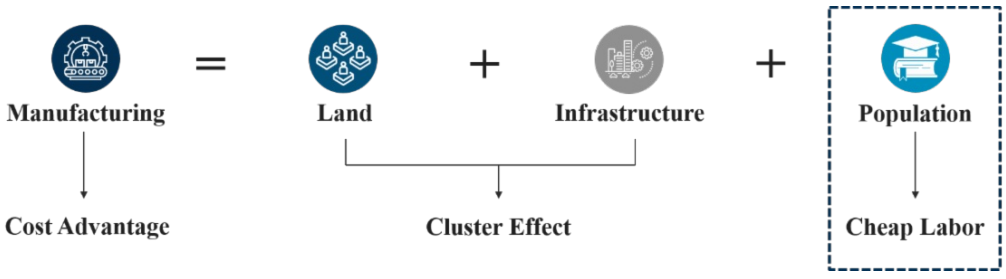

Figure 1: China's success path in manufacturing

China's demographic advantage is still intact in the near term [2] with a 68.3% labor force participation rate. However, 2022 marks the first negative growth in the nation's total population over the past 60 years. In addition, from 1990 to 2022, the proportion of children under fourteen decreased by 10.8%, while the percentage of seniors over 65 increased by 9.3%. According to the United Nations' projections, by 2050 the drop in labor force growth could outpace China's total population by three times at 58.5%. In the long term, China's aging population combined with an increasingly highly educated population means that China's competitive advantage will no longer be in the low-end cost of labor. Instead, increasing productivity (i.e., output per worker) via new technology and/or new processes will be crucial for China to maintain its 'global factory' moniker.

The smiling curve, illustrated below, shows the value-add potential of different activities along the manufacturing value chain and gives a potential roadmap for China's future development path. The emergence of revolutionary technologies in digitalization allows companies potentially to create more value by outsourcing or adopting relevant enterprise services to increase productivity. China boasts a robust infrastructure with the world's largest optical fiber and mobile broadband networks and expects to have deployed 2.3 million 5G base stations by 2022.[3] The authorities plan to invest another approximately $1.2 to 2.5 trillion by 2025.[4] On the other hand, there remains huge unmet demand in many downstream applications. China's digital economy remains significantly underpenetrated, at only 21% and 41% for its secondary and tertiary sectors, respectively.[5] Many industries in China are highly fragmented with 38 million small and medium-sized enterprises operating in the nation, leading to significant information asymmetry and intense competition that eats away at efficiency and margins. There is a huge amount of data to be harnessed. We will discuss examples in three line segments along the chain representing R&D, production and after-sales.

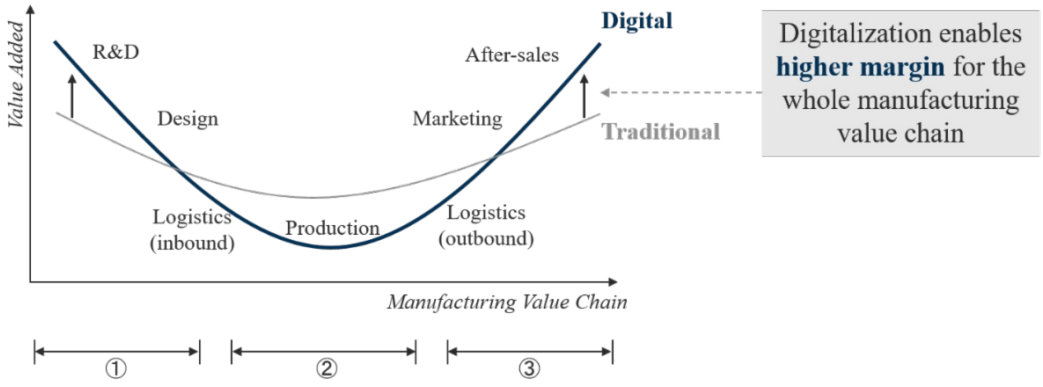

Figure 2: The smiling curve of the modern manufacturing

Segment 1

In the front end, digitalization is able to support faster innovation by allowing manufacturers to create new products that cannot be made in a cost-effective manner with conventional processes. Industrial software such as EDA[6] and CAD/CAE[7] are examples that have supported industrial R&D and design for decades. For example, EDA helps validate chip architectures, CAD supports 3D modeling for industrial products design across automotive and aircraft in heavy industries, and CAE provides stress tests for key components including strength and rigidity for the vehicle body, etc. Digitalization tools seek to raise productivity through extensive simulations intended to test feasibility and compatibility, and discover any critical flaws as accurately and as early as possible to avoid running into a situation where the company might have to abolish an R&D idea after committing significant resources. These types of software have high technical barriers to entry to write, due to the expertise needed in fields such as mathematics, electronic and software engineering, etc. Additionally, the algorithm behind EDA software has undergone decades of iteration and model training for optimization. China's historical focus was heavily on production/assembly, resulting in only 5%[8] self-sufficiency in industrial software. This may

indicate a potential growth opportunity going forward. According to IDC, China manufacturing IT spending is expected to grow at a 5-year CAGR of 16% from 2020 to 2025, outpacing the rest of the world.

Segment 2

In the mid-segment, digitalization is able to reduce costs by replacing repeated, routine work with automation, reducing labor and human error. To achieve automation, data on the three processes of detection, analysis and execution are required. An example is autonomous driving in areas such as commercial logistic fleets. In China as of 2020[9], top long-haul fleet management companies captured less than 10% of the total market share, and they employed over 9.2 million drivers. Fierce competition has been squeezing profits, forcing carriers to reduce their gross margins to only 4% over TCO.[10] The main contributors in TCO for long-haul trucking (that is, operating routes that are greater than 800km) companies are fuel and labor which contribute 46% of total costs as, 1) two drivers are required to rotate driving 2) driving at inconsistent speeds over long distances can result in more fuel consumption. Companies also have to contend with additional costs in the form of vehicle accidents and management costs given the high turnover rate of truck drivers. Robotrucks with autonomous driving capabilities present a potential value proposition to increase efficiency for carriers. These system providers have already proven their ability to generate savings on TCO of roughly $7.5 million for a fleet with 3,000 trucks, by reducing unnecessary human resource costs and avoiding losses brought by dangerous driving.

Figure 3: Robotruck's means of processing data

Segment 3

In the back end, digitalization can increase income by aggregating information on market demand allowing more cost-effective customer acquisition. The platform economy provides a flywheel for generating growth. China's textile industry is an example of one undergoing digitalization. There are over 500,000 yarn and fabric manufacturers in China who historically were subject to seasonality and run significantly under-capacity during the non-peak production season. The industry has over 60,000 single product units ("SPU"s), and the production line needs to be reset for every SPU, rendering a low capacity utilization of only 75% per machine. A digital consolidation platform can be a solid solution. The platform acts as a central processing unit for the industry, aggregating identical SPU orders from various customers and then intelligently allocating them to fabric manufacturers. This also reduces the searching costs for the over 10,000 buyers in the industry, which in turn may attract more buyer traffic and increases orders for manufacturers. Specifically, a company was able to increase manufacturers' machine utilization to 95% through its platform.[11] There remains significant room for consolidation of highly fragmented industrial sectors given only 21% digital penetration in China's secondary sectors.

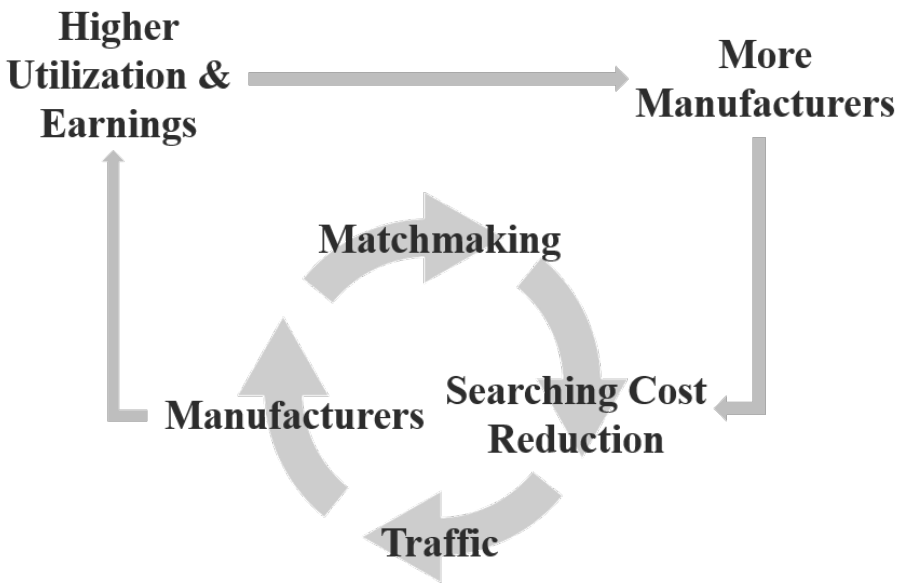

Figure 4: Flywheel effects in the textile industry by the platform economy

To sum up, the digitalization of industrial value chains can potentially create three key outcomes: 1) rapid product creation and iteration through software simulations; 2) cost reduction through automation; and 3) income growth through customer aggregation. We see significant opportunities in the future for China to move up the value chain by adopting technologies that offer better economics for other businesses.

Productivity through innovation – Advanced Manufacturing

As the concept of cost advantage has been taking root in China's manufacturing, innovation almost always carries the end goal to elevate efficiency, or we can simply name it 'iteration-driven innovation'. China has developed well beyond production only and has shown its competitiveness in other areas. As we illustrated in our 'China Corporate Debt' series, China is now a dominator across the photovoltaic supply chain and enjoys relatively lower electricity costs compared to its developed peers. The story began with Chinese panel makers (midstream) taking the majority of the global market. The lead position, then, supported innovation in upstream wafer materials from polycrystalline to monocrystalline, which provides higher conversion efficiency and lower decay rate. The newly developed materials, in return, further drive down electricity prices for the whole society, creating a virtuous circle. Similarly, Chinese players are continually pursuing revolution in materials and components to seek to achieve similar patterns. In other words, innovation in upstream materials and technology solutions offers an upgrade in both quality and sustainability, which can improve efficiency within that very industry.

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CHINA NEWS SPOTLIGHT

China's Exports Shifting from West to Global South: Central Asian countries increased imports from China in March by 55% over the year-earlier month, beating the 35% jump in Chinese shipments to Southeast Asia reported previously. Former Soviet republics as well as Turkey and Iran all contributed to a near-record gain in Chinese exports to the region, a focus of Beijing's Belt and Road Initiative. *Read More.*

China Affirms ex-Soviet Nations' Sovereignty after Uproar: The Chinese government said Monday it respected the sovereignty of former Soviet Union republics after Beijing's ambassador to France caused an uproar in Europe by saying they weren't sovereign nations. Ambassador Lu Shaye was being called on the carpet by the governments of former Soviet republics, and French

President Emmanuel Macron, since Lu's comment to a French broadcaster. *Read More*.

China's Central Bank Adds Liquidity via Reverse Repos : China's central bank injected funds into the financial system through open market operations Sunday. The People's Bank of China said it has conducted 89 billion yuan ($12.95 billion) of seven-day reverse repos at an interest rate of 2 percent. *Read More.*

NetEase Subsidiary Sues Blizzard, Demanding Return of $43.5M: Shanghai Wangzhiyi Network Technology, a subsidiary of Chinese internet company NetEase, recently filed a lawsuit against Blizzard Entertainment for violating a series of licensing agreements in Shanghai, demanding the latter to return 300 million yuan ($43.5 million) in arrears, according to a report by 36Kr on April 24. *Read More.*

Tesla Readies Export of Model Y to Canada from China: Tesla has begun producing in Shanghai a version of the Model Y to be sold in Canada this year, the first time it will ship cars to North America from China, according to a person with direct knowledge of the plan and a production memo seen by Reuters. *Read More.*

China Pumps $7bn into Upgrading Chip Supply Chain: Chinese chip making suppliers and state-backed funds plan to spend an estimated 50 billion yuan ($7.26 billion) to strengthen the domestic supply chain as the U.S. curbs tech exports. "We cannot avoid decoupling in semiconductors," Chiu Tzu-Yin, president of state-backed wafer giant National Silicon Industry Group (NSIG), said at a chip supply chain conference hosted in Guangzhou for two days through Wednesday. *Read More.*

AstraZeneca Oncology R&D Head On China Biotech Innovation: AstraZeneca PLC was once known as the sort of multinational that once moved quickly to get its hands on an innovative drug asset originated in China. Over the past few years, however, it has been largely missing from the deal-making scene whereby various Chinese drug candidates have been scooped up by a collection of international drug makers. *Read More.*

Legend Biotech Soars After Cancer Drug Trial Results Revealed Early: Legend Biotech Corp. shares jumped as much as 21%, the most since June 2020, after a European medical association unexpectedly published results from a much-awaited bone marrow cancer drug study conducted in partnership with Johnson & Johnson. *Read More.*

China Billionaire's Grand Pharma Buys BlackSwan Vascular For $37.5 Million: BlackSwan, headquartered in Hayward, California, was founded in 2017 by Suresh Pai and Celso Bagaoisan of LamaMed, LLC, and Sanjay Shrivastava of U.S. Vascular, LLC. Sirtex Medical, a provider of therapies for liver cancer, bought BlackSwan for an undisclosed amount in 2020. Sirtex itself had earlier been acquired by Chinese investment firm CDH and Grand Pharmaceutical in 2018 for $1.4 billion. CDH owns about 10% of Grand; Hu owns approximately 56%. *Read More.*

[1] The Bund is a historic waterfront area in central Shanghai, where Morgan Creek's office is located. From the 1860s to the 1930s, it was the rich and powerful center of the foreign establishment in Shanghai, operating as a legally protected treaty port. The picture above is part of the historical waterfront.

[2] Note: The percentage numbers in this paragraph are all as the percentage of the total population; Source: Wind Economic Database

[3] Source: Chinese operators recorded a net gain of 34.33 million 5G subscribers in November https://www.rcrwireless.com/; Jan 3rd, 2023

[4] Source: GF Securities

[5] Source: Guotai Junan, data as of 2021

[6] Note: EDA stands for Electronic design automation;

[7] Note: CAD stands for Computer-aided design; CAE stands for Computer-aided engineering

[8] Source: China Galaxy Security

[9] Source: Mckinsey Report

[10] Note: TCO stands for the total cost of ownership; TCO of freight includes the costs related to the transportation of products in the supply chain.

[11] The data provided came from a private company during Morgan Creek's due diligence process.

opinions. Further, Morgan Creek does not warrant the accuracy, adequacy, completeness, timeliness or availability of any information provided by non-Morgan Creek sources.