The Digital economy and Chinese opportunity for leapfrogging

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- Industrial revolution and windows of opportunity
- The development of digital economy in China
- Digital era: the chance of leapfrog?
- Conclusions
Innovation research

• Macro level: national innovation system
• Meso level: industrial, regional innovation
• Micro: innovation in business and network level

• This work is macro level
A: Introduction

USA leads in the 2nd and 3rd Revolutions

1. Industrial revolution
   Through introduction of mechanical production plants using water and steam power
   Late 18th century

2. Industrial revolution
   Through introduction of division of labor mass production
   Early 20th century

3. Industrial revolution
   Through use of electronics and IT to further automate production
   Early 1970s

4. Industrial revolution
   Based on cyber-physical systems (CPS) and dynamic data processing
   Today and in the near future

Productivity

UK ---> Germany ---> U.S. ---> U.S., China?

1st 2nd 3rd 4th?
<table>
<thead>
<tr>
<th>Industrial revolution</th>
<th>Leading country</th>
<th>Organizational innovation</th>
<th>Institutional innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>UK</td>
<td>Factory</td>
<td>IPR; land system</td>
</tr>
<tr>
<td>Second</td>
<td>Germany</td>
<td>inventors establish enterprises, building the lab of enterprises,</td>
<td>Research universities joint-stock enterprises, separation of two rights</td>
</tr>
<tr>
<td></td>
<td>U.S.</td>
<td>Scientific management, Standardized mass production,</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>U.S</td>
<td>High-tech industrial cluster</td>
<td>Bayh-Dole Act, Venture capital</td>
</tr>
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Question:

• Now, the fourth industrial revolution are kicking off

• Does this may give other countries the opportunity to leapfrog.

• China is one of the candidates.

• Approach: Industrial revolution, windows of leapfrogging, Institutional approach
B framemwrok: industrial revolution and Windows of opportunity

• The revolution opened with stages and new institutions and organizations (Miettinen, 2014).

• Facing with new industrial revolution, with trap of former institutional and technology regime, there will be new opportunity for latecomer countries (Liu et al., 2019).

• In second industrial revolution, Germany and USA became the leading country by innovation of mass production and labs in enterprises.

• During the third revolution, USA is the leader, but Japan catches the opportunity to become the global IT leaders too. The global flagship enterprises are Sony.
Lessons from Japan

• Catching up in the second and third industry revolution.
• Mastered the core technology in chemical, automobile and semiconductor industry.
• With its technology in quality control and JIT.
• Once being a frontier country in the world in 1960s ranked the second.
• But lack behind again when USA reshaped the industry with digital technology.
B: Industrial revolution and windows of leapfrogging

How do latecomers catch up and leapfrog?

Windows of opportunity

• The role of the rise of new techno-economic paradigms in the leapfrogging of latecomers who take advantage of a new paradigm and overtake incumbents (Perez and Soete, 1988).

• Discontinuities in the dynamics of a sectoral system (Lee & Malerba, 2017).

Why do leaders lag behind?

• The lack of effective responses, “incumbent traps” (Chandy and Tellis, 2000).

• System misalignments or inadequacies in the new window.

• Ignoring new technologies, disruptive innovations, new demand, or newly growing markets.
B: Industrial revolution and windows of leapfrogging

Factors that might impact catching up:

• Initial conditions (Fagerberg, 1988; Fagerberg et al., 2010);
• Macro variables (e.g., labour costs and exchange rates) (Katz, 1995);
• Firm capabilities (Bell and Pavitt, 1993; Kim, 1997; Lall, 2001);
• National innovation systems (Freeman, 1987; Lundvall, 1992; Nelson, 1993).

Three windows of opportunity in the revolution of an industry determines changes in industrial leadership and catch-up (Lee and Malerba, 2017):

• Technological windows (Korean V.S. Japan in consumer electronics)
• Demand windows (demand for low cost cars in India).
• Institutional/public policy windows (telecommunications industry in China).
The Window of Opportunities in Catch up: The Unique Context of Chinese Enterprises

**Technology opportunity**
- Paradigm shift,
- disruptive

**Globalization**
- FDI and import spillover
- Global value chain and manufacturing network
- ODI under western crisis

**Domestic market opportunities**
- Low cost
- Complex market segmentation
- Big and growing demand
- market ladder

**Institutional change and policy**
- Resources acquisition from public fields under transition economy
- National innovation policy
- Local government
Fourth industrial revolution: key elements

Factory 4.0

Intelligent robot

Artificial intelligence

Mass customization

Big data

Cloud computing

Internet of Things

Technological change may enable catching up and leapfrogging and create disruption and significant transfer of leadership from one country to another.

Windows of opportunity for latecomer countries and firms?
C: The development of digital economy in China
The catch-up of China

– Ranked first in manufacturing in 1860s and then fell behind, catch up in the 2\textsuperscript{nd}, 3\textsuperscript{rd} revolution.


– The dominant design and core technology has already existed during 2\textsuperscript{nd} and 3\textsuperscript{rd} IR in developed countries.

– Heavily depend on USA in chip and software etc.
Industrial Revolution (IR) and Development: an overview

Now, 4th IR, the same beginning point, though different base.

A good chance for China to leapfrog?

What is core tech, this is a question? New model of innovation different from third IR.
Three stages of digital economy in China

- **Sprouting period** (1994-2002) —— copy and learning stage
  - China got the Internet access in 1994.
  - Portals: Sina, Sohu, Netease
  - E-commerce: Alibaba, JD
  - Search engine and social media: Baidu, Tencent

- **Business model**
  - Very simple.
  - Based on *imitation* from foreign leading countries.
  - Few attention to technological innovation.
Three stages of digital economy in China

• Growth period (2003-2012) —— catching up and localization
  • The scale of internet users increases rapidly.
  • Support of Chinese government in Internet.
  • The popularity of Social network site (SNS): Blog, QQ
  • The great potential in e-commerce.
  • Alibaba: Taobao(2003), Alipay(2003)

• Business model
  • Localization (Taobao V.S. eBay).
  • The revolution in customer side (Different from Walmart, delivery industry).
  • Internet users participate actively and deeply.
  • Enterprises benefit from the increase of user scale.
  • The rising of BAT in China
Three stages of digital economy in China

• Mature period (2013-now) —— *climbing for frontier country*
  • Smart phones, transition to **Mobile internet era**.
  • Traditional industry + Internet
  • Online service providers: Didi (an online ride-sharing platform), Meituan, ofo, Mobike etc.
  • 5G Huawei,

• Business model
  • More complicated, good at integration.
  • Two-sided model, advertisement, subsidy to users.
  • Venture capitals, private enterprises are main players.
  • Core tech relies on developed countries in Laptop, mobile phones...*(operating system, chip etc.)*
D: Some trends of China’s leapfrogging

1. Be able to take risk and learn in some new business model fast than some developed countries
P2P in China (INFIN innovation)

- **2006** • First P2P(person-to-person/peer to peer)
- **2010** • Few entrepreneurs started business, simple model.
- **2012** • Huge increase, over 2000 firms, more complicated and localized model.
- **2013** • Grew fast, 1-2 firms everyday, problems appeared gradually.
- **2015** • Related rules were released by central bank, supervision became mature.
- **2016** • Several regulations were released from CBRC, Central government.

- **No rules, low barriers and the delay of governance** before 2016, both entrepreneurs and investors are risk-taking, resulting in the large potential of financial risks.
- Low risk management, many platforms went bankruptcy in 2018, disasters for individual investors.
- Comparing with the U.S., high barriers (strict registration system).

- **Now: Bitcoin, blockchain are developing in China**
Some factors for leapfrogging

2. From big data, e-commerce to high end technology: Cloud
The case of Chinese enterprises—Alibaba

1999: built in Hangzhou, Zhejiang province.
2003: Taobao, Alipay
• Private enterprise, connects retailers to customers.
• E-commerce, online payment, B2B transaction changes China.
• Taobao village from 2009 to 2014, increase employment.
• Low-end manufacturing, low cost, imitation-based, no revolutionary impact on China’s manufacturing.

2009: Alibaba Cloud
• Global cloud computing technology and service provider.
2017: DAMO Academy
New digital era—Alibaba Cloud

• Lead over Amazon.com Inc. and Microsoft Corp. in Asia’s cloud computing market in 2018 according to Gartner.
• The overall cloud market could grow by 55 percent to $331.2 billion in three years.
• Alibaba’s cloud business has been generating triple-digit revenue growth over the past three years, outpacing the industry.
• Alibaba last year accounted for 19.6 percent of the Asia region’s markets for infrastructure as a service and infrastructure utility services.
• Its regional market share rose by nearly a third from 2017, while Amazon’s fell slightly to 11 percent. (Globally, Amazon leads with 30.4 percent to Alibaba’s 4.9 percent.)

• The DAMO Academy: Established in October 2017. It plans to invest 100 billion RMB in three years to conduct basic research and disruptive technology research.
Some trends of leapfrogging

3. From traditional manufacturing to digital network: Industrial Internet platform
Industrial Internet platform

• **Definitions are different**
  • GE: 2012, connect the people, data with machines (2012).
  • According to *Alliance of Industrial Internet*, the core is based on the connection between machines, materials, control system, information system, product and people, through the deep and comprehensive understanding on industrial data, the real-time exchange and transmission, the fast computing, the advanced analyzing and modeling, to realize intelligent control, operation optimization and organizational transformation.

• **Who? Different paths**
  • BAT
  • Industrial leaders: Haier, Foxconn, Sany Group, XCMG
  • ICT firms: Yonyou, Inspur etc.
  • Startups with big data related background: KunlunData, NeuCloud etc.
The case of Haier

- Built in 1984, based in Qingdao, Shandong province.
- Transition from traditional household appliance provider to platform opened for the whole society, incubating makers from different industries.
- **Cross-boundary innovation.**
- **COSMOPlat:** “Customization” + “Iterative innovation” + “Life-cycle value”

Before: Production ➔ Consumption

Now: Consumption ➔ Production
The case of Haier

- **The COSMOPlat**: Based on over 30-year manufacturing experience, building large-scale customized solution platform.
- **Open ecosystem**: Users, suppliers, developers, collaborators, makers, governors, operators.
- **Enabling** small and medium enterprises in 15 industries through its **Industrial Internet platform**.
- Innovation in **model** (mass customization), **technology** (radical and self-control) and **ecosystem** (open and co-created).
- **Internet of Clothes** (衣联网), **Internet of Green Ceramics** (海享陶), **Smart RV solution** (定智旅行), **Textile machinery** (海智造)
The end of bureaucracy

• By G Hamel
Some trends of leapfrogging

4. The creation of new industry: sharing bike
The case of Chinese enterprises—sharing economy

Bike-sharing phenomenon

• China (first mover) —> U.S. (imitation)
• ofo (2015), Mobike (2016), etc., quick diffusion and VC participation.
• Bird, LimeBike and Spin in U.S. electric scooters.

QR code, mobile payment, big data + manufacturing
Sharing Economy

The sharing-bike industry in China

• An intelligent hardware with dockless model.
• Market: Use a smart phone to rent and return your bike momentarily, and accomplish a few kilometers of city cycling with affordable prices, solving the last mile problem in transport in big cities, growing fast in China in the last three years.
• Innovations happened frequently with high-tech and digital platforms.
• **Quick diffusion and VC participation.**
The development of bike-sharing in China

- **2014-2017**: The dockless bike-sharing model led by OFO, emerged as a more convenient alternative to the bikes with docks.

User scale in bike-sharing industry increased fastest among all the Internet apps. By the end of 2017, the scale of bike-sharing industry reached to 221 million, accounting for 28.6% of Internet users.

Source: QuestMobile TRUTH Jul.2017
But, look at the evolution of the whole bike-sharing industry...

<table>
<thead>
<tr>
<th>Time of entrance</th>
<th>Name of companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015.06-2015.12</td>
<td>Ofo (student use in Peking university, then entered into city)</td>
</tr>
<tr>
<td>2016.01-2016.03</td>
<td>Funbike</td>
</tr>
<tr>
<td>2016.04-2016.06</td>
<td>Mobike (city users)</td>
</tr>
<tr>
<td>2016.07-2016.09</td>
<td>Zhixiang bike, Zeebike, Panda bike,</td>
</tr>
<tr>
<td>2016.10-2016.12</td>
<td>Youon, Unibike, Qibei bike, Yibu bike, Joybike, CC-bike, U-bike, Mango, Bluegogo, Hellobike, Xiaoming bike, Kuqi bike, DingDing bike,</td>
</tr>
<tr>
<td>2017.01-2017.03</td>
<td>Baicycle, Deer bike, Wukong bike, Kala bike, 3Vbike,</td>
</tr>
<tr>
<td>2017.04-2017.06</td>
<td>Heibike, 99 Bicycle, Qicaibike, Bianlifeng</td>
</tr>
<tr>
<td>2017.07-2017.09</td>
<td>ZC-bike</td>
</tr>
</tbody>
</table>

Note: companies in red have collapsed until 2018.04, companies in green have been acquired by other platform companies such as Ali, Meituan, Didi. Companies in black are still active in the market.

China(first mover)—>U.S.(imitation)
Now, the sharing scooters industry in the U.S., Bird, LimeBike and Spin in U.S. electric scooters, are faced with the same problems as in China......
5. The progress of artificial Intelligence business

The geographical distribution of artificial intelligence enterprises

Beijing, Shanghai and Guangzhou account for 74.2%.
6. The development of others

- Huawei in 5G field
- Cambricon in intelligent chips
- DJ-Innovation in civilian drones
- ……

Based on over 100 AI chip companies, Compass Intelligence (May, 2018) released Top 24 list. Chinese companies:
12 HUAWEI
14 MediaTek
15 Imagination
20 Rockchip
21 Verisilicon
23 Cambricon
24 Horizon Robotics

China: 7/24 AI Chip companies Top24
D: Conclusions

Challenge or new model?
- **Institutional void and inconsistency**
  - The problem of legitimacy. Government regulations is lagged behind. (Eg. Didi V.S. Taxi)
  - but also a space for innovation. p2P, internet finance, Sharing economy in China
- **Data sharing and privacy problems is a dividing factor?**
  - Different attitudes toward facial recognition in China and western countries.
  - Quality V.S. Quantity
  - Eg. GDPR in EU, 2018.
- **The threatens from uncertain global context** (Huawei problem).
- **The lagging** of large numbers of SMEs that are still in 2\textsuperscript{nd} and 3\textsuperscript{rd} revolution.
D: Conclusions: leapfrogging?

– AI and digitalization is a great opportunity, to deal with the aging of population, the challenge of sustainable development, the transition and upgrade of economy.

– Advantage of big market with strong networking effect

– advantages in owning big data, active entrepreneurial environment and government support. The gap between China and U.S. is small.

– Private enterprises have great potential to catch-up and leapfrog.

– VC is a large force here.

– Good environment for R&D and attracting talents.

Wake up earlier, hope not get up late again!
Thank you!

Q&A
The End of Bureaucracy

by Gary Hamel and Michele Zanini

FROM THE NOVEMBER–DECEMBER 2018 ISSUE

Bureaucracy has few fans. Walmart CEO Doug McMillon calls it “a villain.” Berkshire Hathaway vice chair Charlie Munger says its tentacles should be treated like “the cancers they so much resemble.” Jamie Dimon, the CEO of JPMorgan Chase, agrees that bureaucracy is “a disease.” These leaders understand that bureaucracy saps initiative, inhibits risk taking, and crushes creativity. It’s a tax on human achievement.

Though mindful of its evils, many people believe bureaucracy is unavoidable. Dimon remembers an outside adviser who defended it as the “necessary outcome of complex businesses operating in complex international and regulatory environments.” Indeed, since 1983 the number of managers, supervisors, and administrators in the U.S. workforce has grown by more than 100%, while the number of people in all other occupations has increased by just 44%. In a survey by Harvard Business Review, nearly two-thirds of respondents said their organizations had become more bureaucratic in recent years. Peter Drucker’s prediction that today’s organizations would have half as many layers and one-third as many managers as their late-1980s counterparts was woefully off the mark. Bureaucracy has been thriving.
Meanwhile, productivity growth has stalled. From 1948 to 2004, U.S. labor productivity among nonfinancial firms grew by an annual average of 2.5%. Since then its growth has averaged just 1.1%. That’s no coincidence: Bureaucracy is particularly virulent in large companies, which have come to dominate the U.S. economy. More than a third of the U.S. labor force now works in firms with more than 5,000 employees—where those on the front lines are buried under eight levels of management, on average.

Some look to start-ups as an antidote. But although firms such as Uber, Airbnb, Farfetch, and Didi Chuxing get a lot of press, these and other unicorns account for a small fraction of their respective economies. And as entrepreneurial ventures scale up, they fall victim to bureaucracy themselves. One fast-growing IT vendor managed to accumulate 600 vice presidents on its way to reaching $4 billion in annual sales.

Why is bureaucracy so resistant to efforts to kill it? In part because it works, at least to a degree. With its clear lines of authority, specialized units, and standardized tasks, bureaucracy facilitates efficiency at scale. It’s also comfortably familiar, varying little across industries, cultures, and political systems.

Despite this, bureaucracy is not inevitable. Since the term was coined, roughly two centuries ago, much has changed. Today’s employees are skilled, not illiterate; competitive advantage comes from innovation, not sheer size; communication is instantaneous, not tortuous; and the pace of change is hypersonic, not glacial.

These new realities are at last producing alternatives to bureaucracy. Perhaps the most promising model can be found at a company that would not, at first glance, appear to be a child of the digital age. Haier, based in Qingdao, China, is currently the world’s largest appliance maker. With revenue of $35 billion, it competes with household names such as Whirlpool, LG, and Electrolux. At present, Haier has some 75,000 employees globally. Outside China it has 27,000 employees, many of whom joined the company when it bought GE’s appliance business, in 2016.

Over the past decade the gross profits of Haier’s core appliance business have grown by 23% a year, while revenue has increased by 18% annually. The company has also created more than $2 billion in market value from new ventures. Those feats are unmatched by any of Haier’s domestic or global competitors. This remarkable journey hasn’t been entirely pain-free. In recent years Haier dismissed more than 10,000 employees. Yet it has also generated tens of thousands of new jobs in its rapidly expanding ecosystem. Haier’s logistics network, which stretches across China, now includes more than 90,000 independent drivers, for instance.
Microenterprises are free to form and evolve with little central direction.

Haier’s success is the result of a root-and-branch overhaul of its once-traditional management model. Having long viewed bureaucracy as a competitive liability, Zhang Ruimin, Haier’s renegade CEO, has for a decade led an effort to build a company where everyone is directly accountable to customers (a policy he describes as “zero distance”), employees are energetic entrepreneurs, and an open ecosystem of users, inventors, and partners replaces formal hierarchy.

Haier’s shorthand for these practices is *rendanheyi*, a mash-up of Chinese characters that connotes a tight coupling of the value created for customers with the value received by employees. The *rendanheyi* model departs from bureaucratic norms in seven critical ways, which we’ll look at in depth in this article.

1. From Monolithic Businesses to Microenterprises

Large corporations often consist of a few dominant businesses, each with its own orthodoxy about strategy, customers, and technology. These tightly integrated entities and their monocultures make a company vulnerable to unconventional competitors and blind it to new kinds of opportunities. To avoid that risk, Haier has divided itself into more than 4,000 microenterprises, or MEs, most of which have 10 to 15 employees. To be sure, some MEs, particularly in manufacturing, have larger payrolls, but even in them decisions are made by small autonomous teams.

Microenterprises come in three varieties. First, there are roughly 200 “transforming” MEs—market-facing units that have roots in Haier’s legacy appliance business but are reinventing themselves for today’s customer-centric, web-enabled world. Zhisheng, which makes refrigerators for young urban customers, is a typical example.

Second, there are 50-plus “incubating” MEs, or entirely new businesses. Some, like Thunderobot, are focused on emerging markets such as e-gaming, while others, like Xinchu—a “smart” refrigerator that connects users with third-party services that sell fresh food and deliver it within 30 minutes—are wrapping new business models around familiar products.

Finally, there are roughly 3,800 “node” MEs. These businesses sell component products and services such as design, manufacturing, and human resource support to Haier’s market-facing MEs.
Microenterprises are key to Zhang’s goal of building the world’s first company for the internet age. That entails more than developing web-enabled products. It means creating an organizational model that mimics the architecture of the internet: “small pieces, loosely joined,” as the Harvard technologist David Weinberger famously put it. The web is incredibly diverse and yet still coherent. While it has spawned countless innovations, it’s held together by common technical standards that make cyberspace navigable and allow sites to swap resources like data.

Haier’s modular structure is similarly flexible but coherent. MEs are free to form and evolve with little central direction, but they all share the same approach to target setting, internal contracting, and cross-unit coordination.

2. From Incremental Goals to Leading Targets

In most organizations there’s little that supports bold thinking and doing. Old assumptions get challenged only once the business has hit a wall. Not so at Haier.

Every ME is charged with pursuing ambitious goals for growth and transformation—known internally as “leading targets.” Rather than taking last year’s performance as a starting point, objectives are set “outside in.” A dedicated research unit collects product-by-product statistics on market growth rates around the world and then uses that data to establish targets for the MEs.

Market-facing MEs are expected to grow revenue and profit four to 10 times faster than the industry average. In product categories where Haier lags, the bar is set the highest, since there’s plenty of room to increase share. In areas where Haier leads, the target is more modest but still a multiple of the market baseline. As one ME’s leader put it, “If you’re number three or four in the market, leading targets force you to think about how to become number one, and if you’re number one, they force you to think about how to extend your lead.”

While ambitious, the targets do get adjusted when circumstances change. For example, when the Chinese government revamped its energy efficiency standards for appliances in a way that favored Haier’s already efficient refrigerators, the Zhisheng ME raised its targets.

Every market-facing ME is also expected to make a transformative leap from selling products and services to building an ecosystem. A good example is Community Laundry. Having developed a popular smartphone app that allows university students across China to schedule and pay for the use of dormitory laundry facilities, the ME gave outside vendors access to the app’s more than 9 million users. Today the Community Laundry platform hosts dozens of other businesses and takes a share of the revenue they generate.
Haier tracks the transformation of every ME with a “win-win value-added” statement, which captures detailed metrics such as the extent of user involvement in product development, the degree to which Haier’s products offer unique customer value, and the percentage of profits derived from ecosystem revenue.

Every market-facing ME is expected to eventually build a business ecosystem.

Like their market-focused siblings, node MEs have leading targets that are pegged to external benchmarks. A manufacturing node, for example, may be responsible for lowering costs, cutting delivery time, improving quality, and further automating its production facilities.

3. From Internal Monopolies to Internal Contracting

In most organizations, a significant percentage of employees are insulated from market forces. They work in functions that are, in essence, internal monopolies, such as human resources, research and development, manufacturing, finance, information technology, and legal affairs. However inept or inefficient these internal providers may be, they can’t be fired by the units they serve.

At Haier every ME is free to buy services, or not, from other MEs. (A typical user ME will have agreements with dozens of nodes.) If an ME believes that an external provider would better meet its needs, it can go outside for services. Senior executives virtually never interfere with internal negotiations.

Each year every market-focused ME looks at its performance objectives and asks itself, “What sort of design, technology, production, and marketing support will we need to meet these goals?” Once it has the answers, it asks the nodes for bids. Usually, two or three nodes will respond with proposals. The ensuing discussions provide an opportunity for all parties to challenge existing practices and brainstorm new approaches.

While the process may sound cumbersome, it’s facilitated by “presets”: predefined rules about margin split and minimum performance standards that reduce friction during negotiations. Terms can be renegotiated over the course of a year as circumstances change—hence Haier’s preference for the word “agreement” over “contract.” One ME leader told us that he had replaced a dozen nodes with other suppliers in the past 18 months. Nodes that are unable to provide competitive service can and do go out of business.
A substantial part of a node’s revenue depends on the success of its ME customers. When a customer unit fails to meet its leading targets, the node takes a hit. Every node is thus invested in the performance of the market-facing units, and every employee’s pay is linked to market outcomes. Zhang is only slightly exaggerating when he says, “At Haier we are no longer paying our employees. Instead, they are paid by customers.”

This compensation model has three benefits. First, it discourages mediocrity. Nodes that don’t deliver high levels of service lose their internal customers. Second, it unites everyone around the goal of creating great customer experiences. When a user ME seems in danger of missing its targets, representatives of all its supplier nodes quickly come together to resolve the problem. Third, it maximizes flexibility: Market-facing MEs are free to reconfigure their network of service providers as new opportunities emerge.

4. From Top-Down Coordination to Voluntary Collaboration

How does a company with more than 4,000 independent operating units synchronize major investments in technology and facilities? How does it build cross-business capabilities such as manufacturing automation?

New offerings don’t get a significant budget until they’re validated by users.

In a start-up, coordination happens spontaneously. When there’s a problem people simply huddle and hash things out. As a company grows and operating units become more siloed, coordination becomes increasingly difficult. The typical solution involves more layers, mandates, and corporate-level functions.

Haier has a different approach: organizing all MEs into platforms. Some platforms bring together MEs operating in a similar category, like washing or audiovisual products, while others focus on building new capabilities, such as digital marketing and mass customization. A typical industry platform encompasses more than 50 MEs. (See the exhibit “A New Organizing Principle” for a snapshot of one.)

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**A New Organizing Principle**

Haier is made up of thousands of microenterprises (MEs), which are grouped into platforms. Below is a map of the refrigeration platform.
Any user ME is free to hire and fire nodes as it sees fit—or to go outside for services if it believes an external provider can better meet its needs.

It’s the job of the platform owner to get ME teams together and help them identify opportunities for collaboration, such as developing expertise in the internet of things. Critically, no one reports to the platform owner, nor does the platform owner have a staff. Here’s how Wu Yong, the refrigeration platform owner, describes his role in getting MEs to adopt a new frost-free technology, a move that required an expensive upgrade of production facilities: “I helped facilitate, but the microenterprise teams planned and executed the job together.”

Platform owners have leading targets and are expected to grow their platforms by developing new MEs. In 2014, for instance, motivated by Haier’s goal of becoming the world leader in smart appliances, Wu funded the networked refrigerator start-up Xinchu. Platform owners are as much entrepreneurs as facilitators.
“Integration” nodes, found within every industry platform, help MEs import technology from across Haier and identify internal partners that can coinvest in new initiatives. Like platform owners, integration nodes encourage collaboration rather than exert control.

MEs also rely on the expertise of competence-focused platforms. Two of the most important are smart manufacturing and marketing, each of which employs fewer than 100 individuals. The largest node within the manufacturing platform provides technical support for mass customization. Another node, smart engineering, deploys advanced production tools for the company.

The primary role of the marketing platform is supplying customer information. While every user ME collects copious amounts of information through its own social media channels, the marketing platform’s “big data” node integrates information from Haier’s corporate website and from other sources within the company and without. The idea is to unearth cross-business insights and build predictive models that help MEs respond to emerging customer needs. One example: alerting MEs in the washing platform that a customer has bought a refrigerator and an oven and may be in the midst of a remodel that will call for new laundry equipment as well.

While the marketing and manufacturing platforms do set standards—for brand visuals and factory automation software, for example—they issue few commands. And like other units at Haier, they have a financial stake in the success of their internal clients.

A final bit of grease on the runners of internal collaboration comes from Haier's shared accountability to customers. When, for example, several MEs began hearing that Haier’s smart products didn’t talk to one another, they convened and hammered out a “grand bargain” in which Xinchu would provide a common software platform for the company’s networked devices while other MEs would contribute customer research and supporting technologies. The shared ecosystem, XCook, now encompasses 100 million end users and 400 partners.

In most companies, coordination means sacrificing speed and responsiveness for greater efficiency. Zhang believes that such trade-offs are best made by those closest to the customer, by MEs that are free to choose when to collaborate and when to go it alone.

Remember Weinberger’s phrase “small pieces, loosely coupled”? The coupling of MEs is decidedly loose but still strong enough to ensure that Haier exploits its size and scope. Turns out it really is possible to achieve coordination without centralization.

5. From Rigid Boundaries to Open Innovation
Bureaucracies are insular. Typically, they make sharp distinctions between insiders and outsiders and are characterized by secrecy and a reluctance to tap external partners for mission-critical tasks. The problem with a closed system is that it doesn’t adapt—it atrophies. Recognizing this, Haier sees itself not as a company but as a hub in a much larger network. The implications of this view are profound.

First, every new product or service at Haier is developed in the open. For example, when the company set out to build a new home air conditioner, it used Baidu’s social media site to ask potential users about their needs and preferences. More than 30 million responses flooded in. Lei Yongfeng, the project leader, then invited more than 700,000 users to go deeper and share their thoughts about pain points and detailed product features. Unexpectedly, the top concern was the danger of contracting Legionnaires’ disease. Minimizing that risk became a key priority and led to a radical rethink of the fan blade.

Poorly performing leaders are vulnerable to a hostile takeover.

Second, Haier has assembled a network of 400,000 “solvers”—institutions and technical experts from around the world—that help the company address challenges in some 1,000 domains. More than 200 problems are posted each year on the Haier Open Partnership Ecosystem (HOPE). Lei’s team, for instance, asked for help in designing the blades for its new air conditioner. Within a week the challenge had attracted several proposals. The winning design, mimicking a jet turbofan, came from researchers at the China Aerodynamics Research and Development Center. In all, 33 institutions contributed to the development of the air conditioner. When it launched, at the end of 2013, the Tianzun Wind Tunnel was an instant hit.

In collaborative projects like the Tianzun, Haier creates a “pool” in which its business partners confidentially share their patents—with the understanding that they’ll be rewarded if their technology is used in the final product. Suppliers that contribute to the early design process also get preferred consideration when it comes to vendor selection.

By moving its product development process online, Haier has reduced the time from concept to market by up to 70%. Manufacturing and design nodes, user MEs, potential customers, and business partners work in parallel throughout, starting with the earliest discussions about customer needs. That maximizes creative problem solving and minimizes the risk of clumsy handoffs as the product moves toward launch. While many executives view their businesses as linear value chains, beginning with R&D and ending with sales and support, Haier sees them as value networks in which all parties collaborate at every stage.
A third feature of Haier’s commitment to openness is its use of crowdsourcing to gather feedback on products and defray development costs. In part this is a response to the company’s “zero fund” policy, in which new offerings don’t get a significant budget until they’re validated by users. Take the Air Cube, a groundbreaking combination of humidifier and air purifier. During its gestation, more than 800,000 online “fans” offered comments on it. Once a prototype was ready, it was made available on a popular crowdfunding site, where more than 7,500 individuals opted to buy a preproduction model. Their feedback helped Haier further refine the Air Cube before its formal launch.

Finally, Haier uses HOPE and other online platforms to recruit talent. Many MEs are led by people who joined the company after making standout contributions online. Tan Lixia, Haier’s chief financial officer, sums up the company’s mindset toward open innovation this way: “The border of the company is not important. If you can help create value for users, it shouldn’t matter whether you’re an employee or not.”

6. From Innovation Phobia to Entrepreneurship at Scale

There’s a reason big companies are frequently outmaneuvered by newcomers: Bureaucracies are intrinsically conservative. As Laurence J. Peter, author of *The Peter Principle*, wryly put it: “Bureaucracy defends the status quo long past the time the quo has lost its status.” To counter this reverence for precedent, many companies have set up outposts in Silicon Valley and other innovation hot spots.

Haier, by contrast, has turned its entire organization into a start-up factory. Its 50-odd incubating MEs currently account for more than 10% of Haier’s market cap. They run the gamut from Hairyongi, a fintech start-up that securitizes loans to small businesses—notably, Haier suppliers and distributors—to Express Cabinets, a network of storage lockers that allows local farmers to deliver directly to consumers in some 10,000 communities. (For more on how Haier builds new ventures, see the sidebar “Birth of a Microenterprise.”)

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**Birth of a Microenterprise**

In May 2013, Lu Kailin, along with three colleagues at Haier, set out to build a laptop computer for video gaming. The upside seemed enormous. Rising incomes and ever-cheaper technology were stoking demand for online games, while the business-oriented laptops on the market were ill-suited to hard-core gaming.

There are three ways to launch a new business at Haier. In the first and most common case, an internal entrepreneur posts an idea online and invites others to help flesh out the nascent business plan. (This is how Zhang Yi, who at the time was an after-sales service manager working in the field, started Express Cabinets.) Second, a platform leader can invite insiders and outsiders to submit proposals for exploiting a white space opportunity. Third, would-be entrepreneurs can pitch their ideas at one of Haier’s monthly road shows across China,
The team’s first step was to pore over 30,000 online reviews of gaming PCs. Having distilled out 13 customer pain points, Lu and his colleagues wrote a note to Zhou Zhaolin, head of the Haier platform that included the laptop business, begging for a meeting. Zhou was initially skeptical. “My first instinct was to kill the project,” he says. But then he realized that this really wasn’t his call. “In making decisions,” he says, “we have to let users and entrepreneurs—not managers—speak.” He gave the team a little seed capital (1.8 million RMB, roughly $270,000), with the understanding that further funding was conditional on a successful market test.

The team set out to produce a new laptop with the help of outside partners such as Quanta Computer, a Taiwanese manufacturer of PCs for Dell and HP. By December 2013, only seven months after it began, the venture was ready to introduce a product. Offered on JD.com, a Chinese e-commerce site, the first batch of 500 brightly colored and aggressively styled laptops sold out in five days. A few weeks later a second batch—of 3,000 units—was snapped up within 20 minutes. Jazzed by that success, the team members crafted a detailed business plan and in April 2014 received an additional 1.2 million RMB from Haier, to which they added 400,000 RMB of their own money in exchange for a 15% stake. VC firms joined in subsequent funding rounds.

A little more than three years later, Thunderobot went public on China’s NEEQ market with a valuation of 1.2 billion RMB (about $180 million). With a staff of 80, the venture now leads e-gaming laptops in China and is making significant inroads into which connect local innovators with platform leaders and members of Haier’s investment and innovation platform.

Every incubating ME is a separate legal entity, funded in part by the founding team. Haier’s leaders, recognizing they may not be well placed to judge the merits of a new idea, often require a start-up team to obtain outside funding from one of the company’s venture capital partners before agreeing to contribute internal resources. In a recent period, nine out of 14 newly hatched MEs received external investment before getting money from Haier. Despite this, Haier often ends up with a majority stake in the start-ups, because it typically has the option of buying out its venture partners using a preset valuation formula.

Like other units within Haier, incubating MEs contract with nodes for development, distribution, and administrative support. Arm’s-length internal agreements allow fledgling MEs to leverage Haier’s size and bargaining power while avoiding the risk of bureaucratic meddling.

Explaining Haier’s penchant for entrepreneurship, one VC said, “Microenterprises are like a reconnaissance unit—they scan the battlefield and identify the most promising opportunities. It’s like a giant search function.” Haier understands that innovation is always a numbers game. The only way to find that next billion-dollar opportunity is to launch a slew of start-ups and give each one the freedom to chase its dream.

7. From Employees to Owners
In a start-up, people tend to think and act like owners. Often they have equity in the venture, and some will have even risked their own capital in hopes of scoring a big win. Start-up teams also have a large degree of autonomy—and no one to blame if things go wrong. It is this combination of upside, freedom, and accountability that gives start-ups their edge.

A study of 780 U.S. companies published by the National Bureau of Economic Research explored the connection between gain sharing, autonomy, and voluntary turnover rates, which the authors used as a proxy for employee engagement. Turns out, neither gain sharing nor autonomy on its own had a significant impact on turnover. But in companies that offered employees both, voluntary turnover was less than half the rate observed when one or none of those two conditions were present.

This makes sense. If you increase employees’ authority without increasing their upside, the additional responsibility may well be seen as a burden. Conversely, if you grant people stock without increasing their authority, they’ll still feel like minions.

At Haier, MEs are expected to be self-managing, and their freedoms are formally enshrined in three rights:

- **Strategy.** The right to decide what opportunities to pursue, to set priorities, and to form both internal and external partnerships.

- **People.** The right to make hiring decisions, align individuals and roles, and define working relationships.

- **Distribution.** The right to set pay rates and distribute bonuses.

These rights come with a commensurate degree of accountability. Targets are broken down into quarterly, monthly, and weekly goals specific to every member of an ME team. That makes it easy to see who’s performing and who’s not. Compensation is tightly coupled with business performance. As is true in most start-ups, base salaries are low. Opportunities for additional compensation are tied to three performance thresholds:

- **Baseline.** When an ME’s quarterly sales and earnings growth exceeds a base target, team members get a bonus proportionate to the amount by which the target was exceeded.

- **Value-adjusted mechanism (VAM).** If the ME achieves a midpoint goal between the quarterly baseline and leading targets, the team's bonus is doubled. At this level, employees are also allowed to contribute their own money, typically 15,000 RMB (about $2,200) each quarter, to a special
investment account. If the team hits the VAM target the subsequent quarter, that investment produces a 100% dividend.

- **VAM annual target.** When an ME team beats its VAM target for four consecutive quarters, it becomes eligible for profit sharing. Twenty percent of the ME's net profits in excess of the VAM goal are distributed to the team, though 30% of that amount will be set aside to fund bonuses the following year. As an ME closes in on its leading target, the profit share increases proportionately, sometimes exceeding 40%.

This combination of bonuses, dividends, and profit sharing gives employees the opportunity for hefty payouts. With so much at stake, it’s hardly surprising that ME team members have little tolerance for incompetent leaders. If an ME fails to hit its baseline targets for three months in a row, a leadership change is automatically triggered. If the ME is meeting its baseline targets but failing to reach its VAM targets, a two-thirds vote of ME members can oust the existing leader.

New leaders are chosen competitively. Typically, three or four candidates will present their plans to the ME team. The discussions are intense, as team members press for details on how prospective leaders will get things back on track. Occasionally, a team rejects the entire slate of candidates and the search process goes to round two.

Poorly performing leaders are also vulnerable to a hostile takeover. Anyone at Haier who believes that he or she could better manage a struggling ME can make a pitch to its team. Performance data for all MEs is transparent across the company, so it’s easy to spot takeover opportunities. If an interloper’s plan is convincing, a leadership change ensues. This may seem extreme, but it’s simply an analogue of the market approach to corporate control. If a company consistently underperforms, its board will eject the CEO—or the business may be bought by a competitor who believes it can manage the assets more effectively.

In most large companies, upside opportunities are modest, often topping out at 10% or 20% of base pay. The implicit message from executives to employees: “We don’t think you can do much that would make a truly significant difference to our business.” Lacking both freedom and upside, frontline employees have little choice but to live down to these meager expectations, and in so doing reinforce management's lack of faith in their abilities. By contrast, Haier does everything possible to turn employees into owners. It is here that one finds the deepest explanation for Haier’s track record of industry-beating growth and innovation.

**CONCLUSION**
Unlike Alibaba or Tencent, Haier isn’t one of China’s new-economy superstars. Thirty years ago the company was a struggling collective enterprise turning out products of dubious quality. Today it’s a case study in what can be accomplished when an established company is willing to challenge bureaucracy’s authoritarian structures and rule-choked practices. Who would have imagined that it’s possible to run a large global business with just two layers of management between frontline teams and the CEO?

The Haier we see today was nearly a decade in the making. The company began testing the concept of small, entrepreneurial sales and marketing teams in 2010. A year later self-managing teams were introduced in product units. Those early tests were instructive. At the outset internal contracting proved problematic. Negotiations were protracted and adversarial as every unit sought to maximize its own success. The solution? Build in a clause that links compensation to marketplace results. That reduced friction and increased alignment, turning a zero-sum game into a joint effort to create value for customers.

As Zhang often reminds his colleagues, it’s impossible to engineer a complex system from the top down. It has to emerge through an iterative process of imagination, experimentation, and learning. When asked how Haier can accelerate its transformation, he has a simple answer: Run more trials and replicate the most successful ones faster, because revolutionary goals are best achieved through evolutionary means.

For decades, most companies have worked diligently to optimize their operations. More recently, they’ve raced to digitize their business models. Important as this is, Haier has done something even more consequential: It has humanized its management model. As Zhang said in a long-ago meeting with one of the authors of this article: “We want to encourage employees to become entrepreneurs because people are not a means to an end but an end in themselves. Our goal is to let everyone become their own CEO—to help everyone realize their potential.” Haier’s empowering, energizing management model is the product of a relentless quest to free human beings at work from the shackles of bureaucracy.

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