

SKDM Consulting

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OLIVER WYMAN

MAINLAND CHINA CASE COMPETITION

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IoT is a booming technology, specially in oil and gas industry. This section deep dives into the growth of IoT over the years and the opportunities to leverage.

2. Company Analysis 6

Our target client is Petrochina. This section cover the analysis of our client.

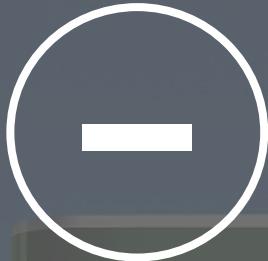
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Petrochina is a market leader in petrochemical space. In this section, we devised a strategy for PC to enter the IoT B2 market.

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This section covers the summary of the entry strategy.





INDUSTRY ANALYSIS

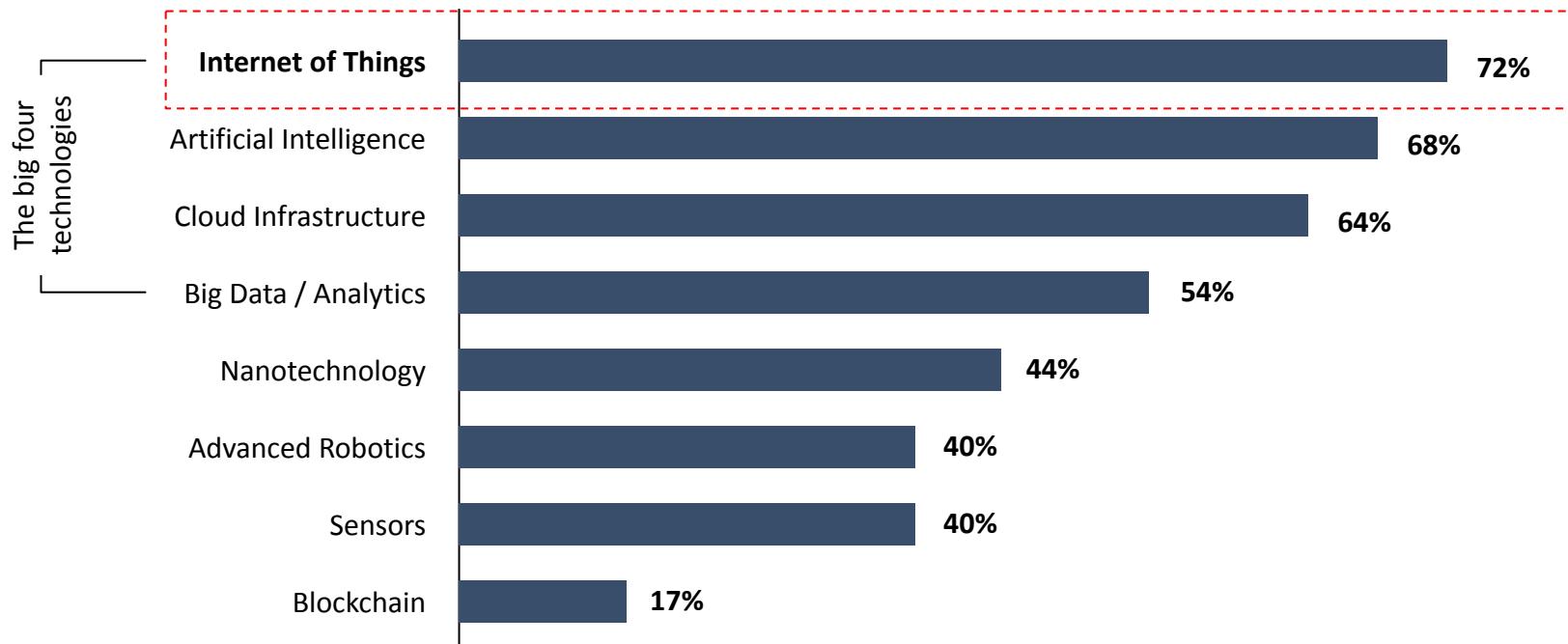
THE IMPORTANCE OF IoT INDUSTRY

Internet of things tops the list of technologies used by organizations which has created the most profound impact on their operations...



Technologies by potential impact..

technologies that will have the greatest impact and could be CXOs' imminent priorities



IoT can help in connecting organizations, generate data for analysis, and drive intelligent operations. Some reasons why companies adopt IoT technology is to reduce cost and increase revenue, improve safety and security, and enhance product quality.

Source: Deloitte Report 'Internet of Things | The rise of the connected world'



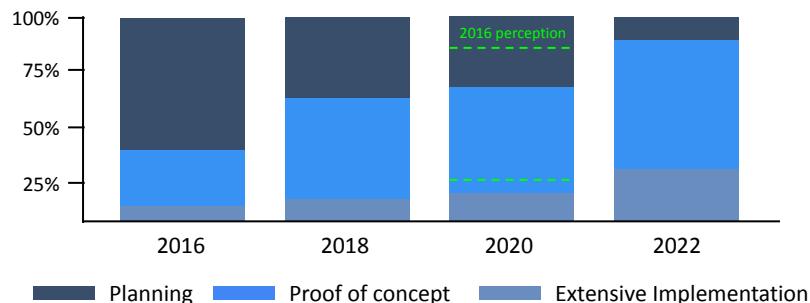
OPPORTUNITIES IN INTERNET OF THINGS

IoT solution providers can improve the market by addressing customer concerns over security, integration and returns on investment...



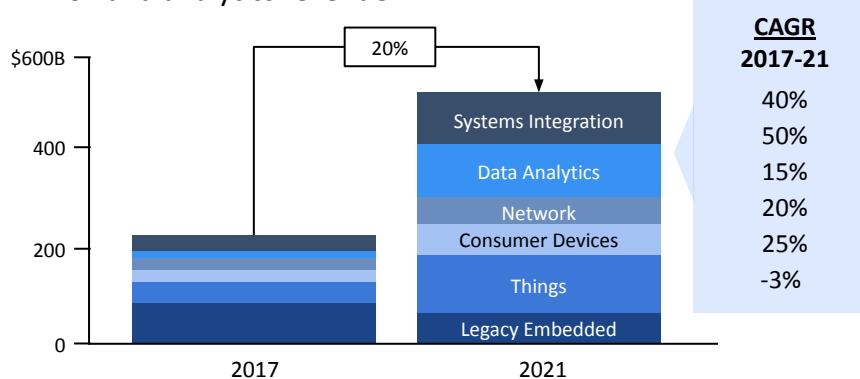
Current stage of IoT adoption in businesses...

% respondents by stage of adoption...



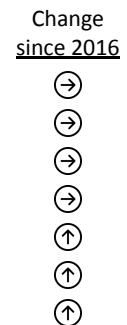
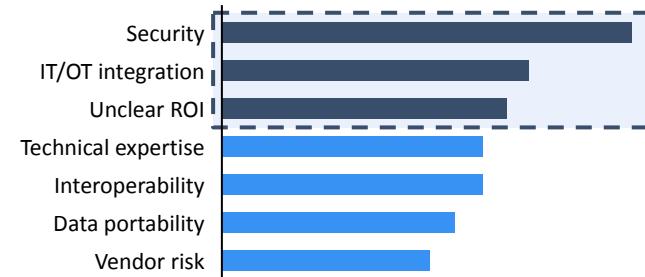
IoT and analytics will grow to \$520 billion in 2021...

IoT and analytics revenue



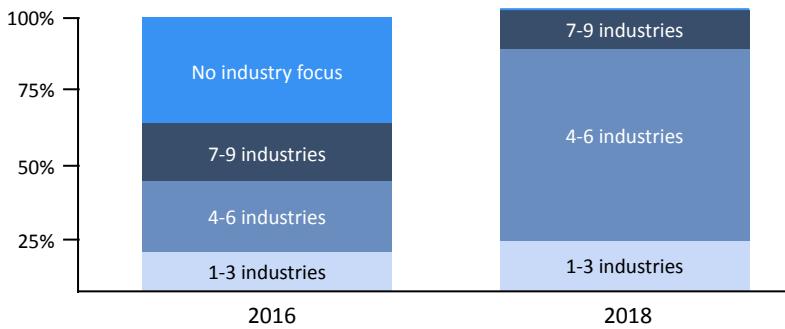
Barriers limiting adoption of IoT solutions...

Vendors need to address custom barriers



Industries investing at least 10% in IoT R&D...

....vendors are narrowing their focus



Source: Gartner; IDC; Harbor; Cisco; Ericsson; Machina research; Bain & Co. | Unlocking opportunities in IoT; Survey conducted by Bain



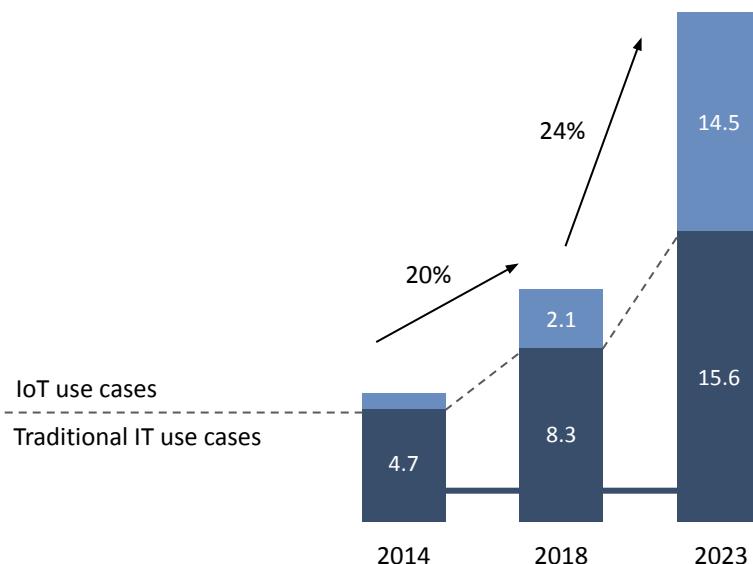
REVENUE POOLS FOR CONNECTIVITY PLATFORMS

APAC is an untapped market when it comes to IoT technology. The majority of device-enablement value pool is based in America, where it was worth €5.5 million...



Revenue pool for IoT and IT devices...

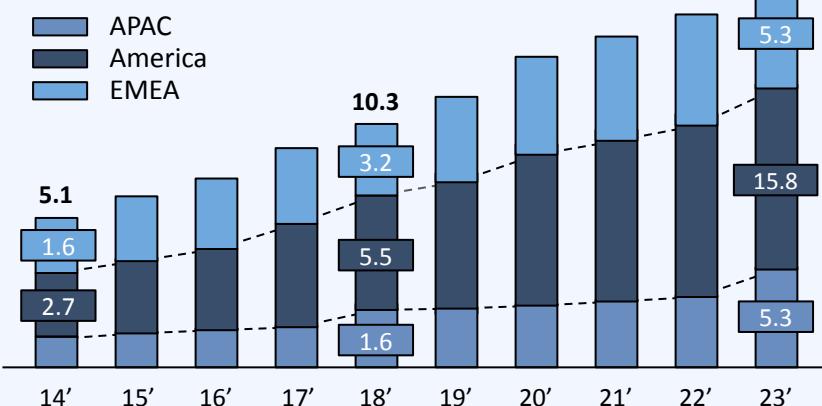
In € billions



Many industries specially oil and gas industry is shifting their focus to IoT initiatives which involves developing bold approaches for managing data, leveraging “brownfield” IoT infrastructure and building new business models.

Region wise split...

In € billions



Basis of companies' size....

In € billions



Source: Mckinsey Report ‘Growing opportunities in the Internet of Things’

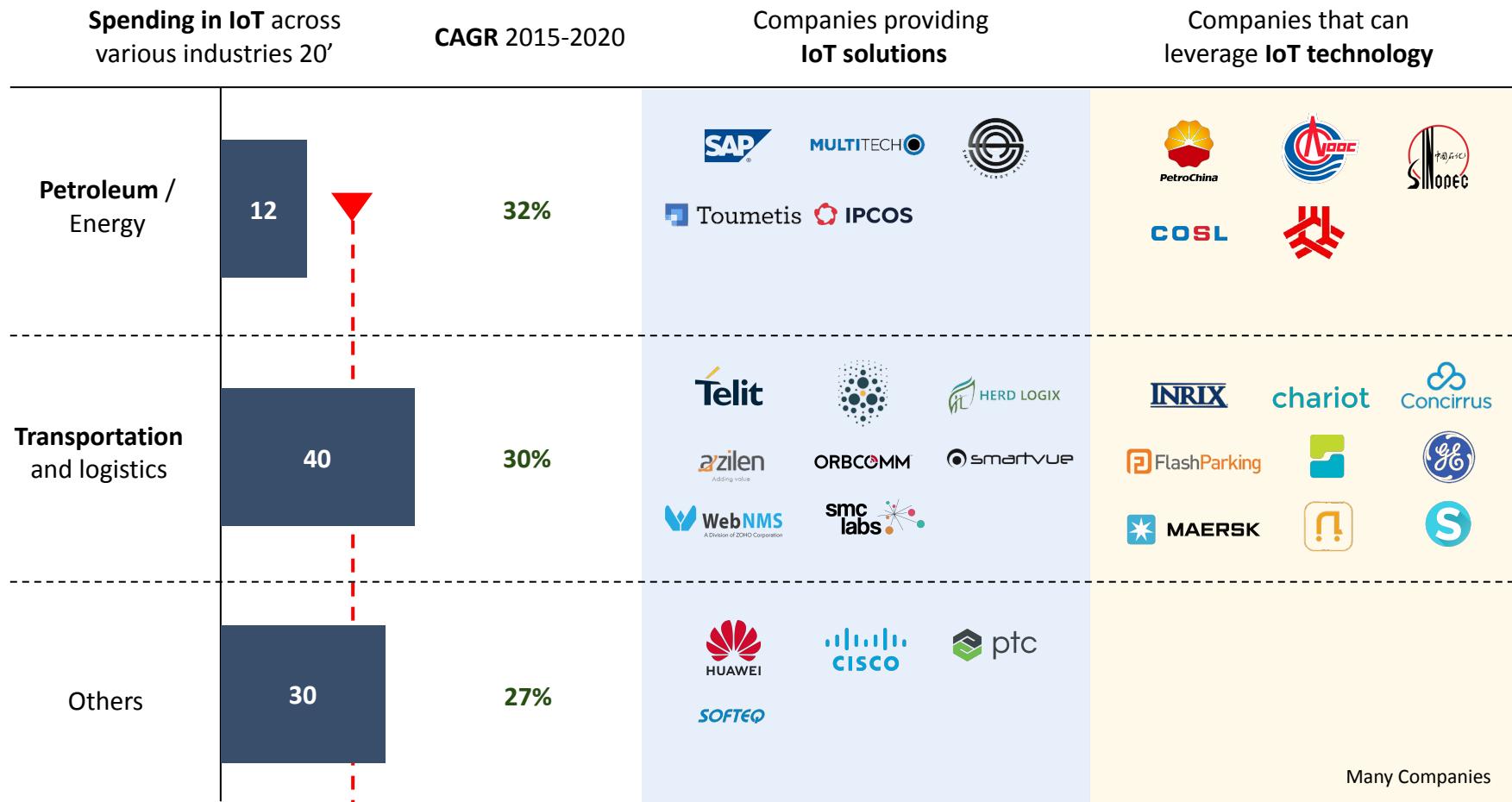


THE IMPORTANCE OF IoT INDUSTRY

Internet of things tops the list of technologies used by organizations which has created the most profound impact on their operations...



PetroChina



Source: Builtin | IoT in transportation ; Data science central ; Oil & Gas IoT Summit ; Startus-Insights



VALUE OF DATA GENERATED BY IoT

How companies can capture the value of the data generated by the Internet of Things and how data ecosystem will play in defining the future....



Value creation factors	Commercial trucking	Farm equipment	Oil refinery equipment
Estimated cost of asset sensors (\$)	~400 ~2000	~100 ~600	~550,000
High cost of downtime or maintenance (\$)	~20,000 Maintenance over truck lifespan	~50,000 Maintenance over tractor lifespan	~2 million ~10 million Lost production due to pump downtime
Potential for IoT to improve operational inefficiencies	Navigation, routing, Vehicle maintenance	High crop yields, improved maintenance	Optimization of operations & OEE

This table shows high potential markets (oil and gas, agriculture and transportation/logistics) for high speed adoption of IoT solutions. There are multiple factors that goes into adoption of IoT solutions by these industries, some of which are : easy connection of industrial assets, the cost of installing sensors and other equipment and connecting it to the IoT platform, high cost of maintenance and downtime and potential improvement in operational inefficiencies. Industries with these characteristics are experiencing an explosion of IoT-enabled offers from startups and technology companies.

Note: The cost estimates are based on per year and will vary based on the type of equipment; OEE = overall equipment effectiveness

Source: BCG | The incumbent's advantage in IoT





COMPANY ANALYSIS

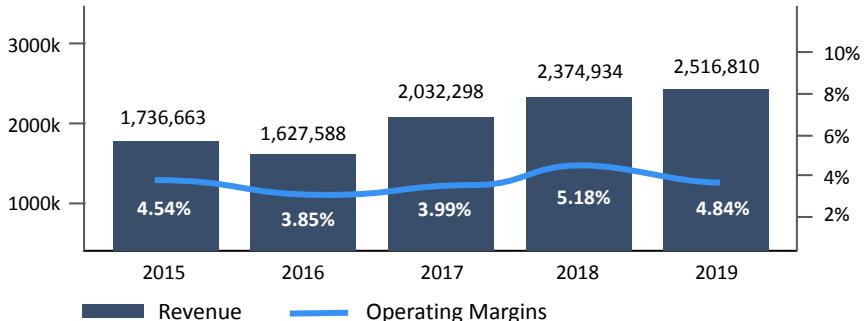
FINANCIAL ANALYSIS

Since the past 5-10 years, Petrochina has shown an exponential growth in the domestic as well as the overseas market...



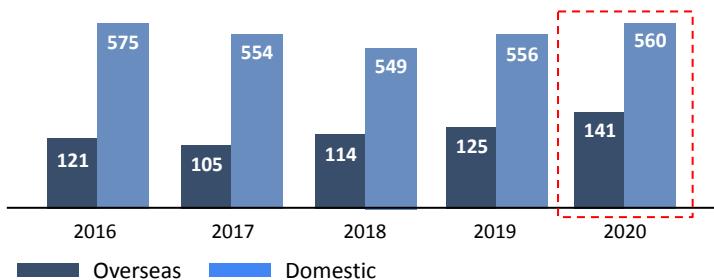
Petrochina has shown a stable growth in the past few years...

Petrochina's revenues and operating margins, in million RMB



Petrochina's crude oil output in domestic and overseas...

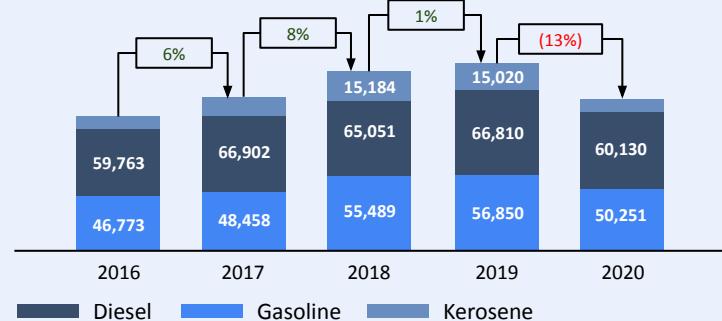
in million barrels



It is in 2019-20 that Petrochina has shown a positive change in the crude oil output with 2.7 % change since 2019 as compared to negative change in 2017..

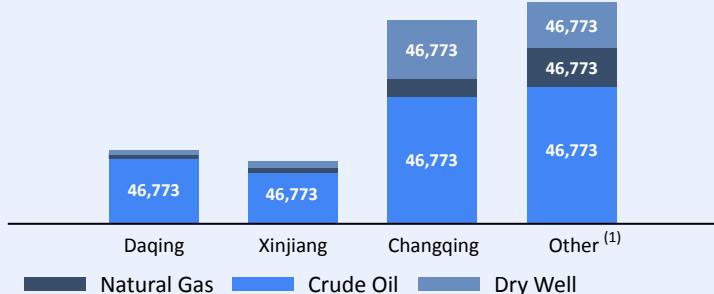
Petrochina is doing well within gasoline and kerosene...

Petrochina's volume sales, in 000' tons



Petrochina's new exploration wells drilled...

....net exploration wells in china, 2019



⁽¹⁾ Others represent North China, Dagang, Qinghai, Yumen, Zhejiang.....

Source: Google finance ; Seekingalpha | Petrochina Oil Laggard ; Bloomberg



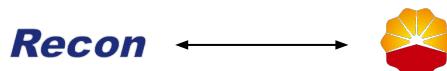
PETROCHINA'S RECENT DEVELOPMENTS

Petrochina had shown interest in IoT tech in the past collaborating with Recon, in spite of having a negative net income in 2020, it is performing well as compared to MCHI...



Petrochina recent investments in technology...

Recon technology announced new IoT projects...



- Recon announced contracts for oil and gas internet of things production project for Petrochina back in 2017.
- This contract totalled approximately \$ 0.9 million.
- This collaboration indicated that Petrochina is planning to enter the IoT space

Petrochina's efforts towards sustaining the environment...

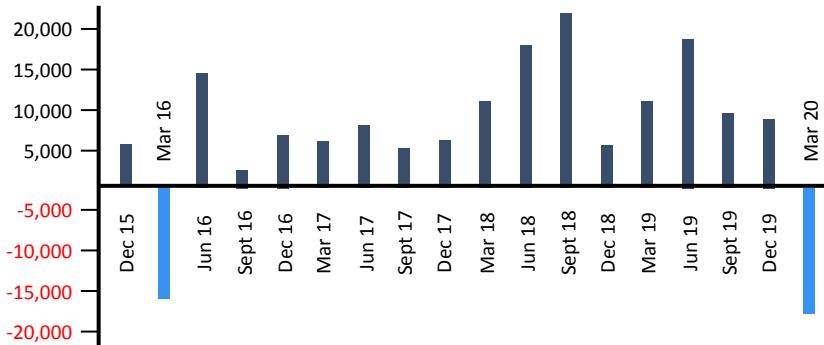
... recent developments #CNPCGreenDevelopment

 CNPC @official_cnpc · Apr 20
Thanks to an improving environment, the West Lake in Hangzhou is as beautiful as heaven on earth. For years, #CNPC has worked on the development of renewable energy such as natural gas, and is now a contributor to the country's green and low-carbon growth. #CNPCGreenDevelopment

 CNPC @official_cnpc · Apr 16
Every April, pear flowers and peach flowers are in full bloom around #CNPC's Huabei Oilfield. It's quite enjoyable to take a stroll here. This place has even become a must-see among locals every year around this time.
#CNPCGreenDevelopment

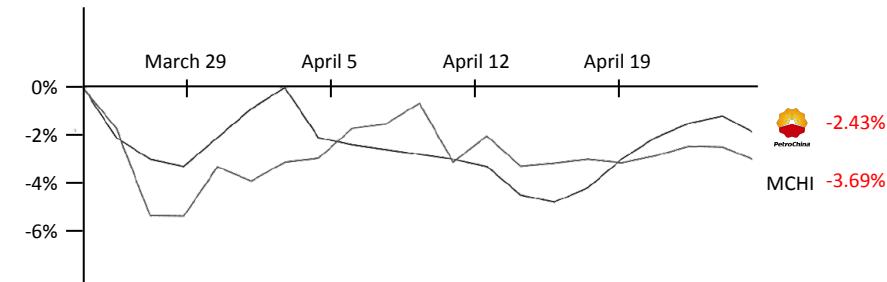
Petrochina's net income...

...recorded a negative income after 4 years



iShares MSCI China ETF (MCHI)...

....Petrochina's performance compared energy index (1M)



Source: Petrochina's Annual Report | Twitter | Google Finance | Thomson Reuters



PETROCHINA'S GREEN AND LOW CARBON TRANSITION PATH

As a clean, low-carbon, safe and efficient energy, natural gas plays an important role in the global energy transition as a transitional source of energy....



	Clean energy substitution 2021-2025	Strategic succession 2026-2035	Green transition 2036-2050
Aim	<ul style="list-style-type: none">By around 2025, Petrochina will endeavor to achieve carbon emissions peak.	<ul style="list-style-type: none">By 2035, endeavor to achieve supply of green and zero-carbon energy exceeding self-consumed fossil energy.	<ul style="list-style-type: none">By around 2050, Petrochina will achieve “near-zero” emissions.
Measure	<ul style="list-style-type: none">Intensify the development and utilization of new energy such as geothermal energy, solar energy, wind energy and hydrogen energy, to promote clean energy substitution for production and coordinated development of new energy, oil and gas industry chain.Actively promote the integrated development of natural gas power generation and new energy power generation to provide society with clean energy products.	<ul style="list-style-type: none">Promote coordinated development of new energy business, oil and gas business, and facilitate the formation of strategic succession pattern for oil and gas resources in new business sectors, such as clean power, hydrogen energy industry chain, clean transition and utilization of fossil fuels.Promote the mass implementation of CCUS and carbon sequestration projects to continuously reduce carbon emissions.	<ul style="list-style-type: none">Continue to increase the scale of new energy development and utilization and strategic succession of oil and gas resources; improve the energy platforms for five major energy sources — oil, gas, heat, electricity and hydrogen.

Source: Petrochina's Environmental, Social and Governance Report 2020



FINANCIAL PERFORMANCE AS COMPARED WITH PEER GROUP

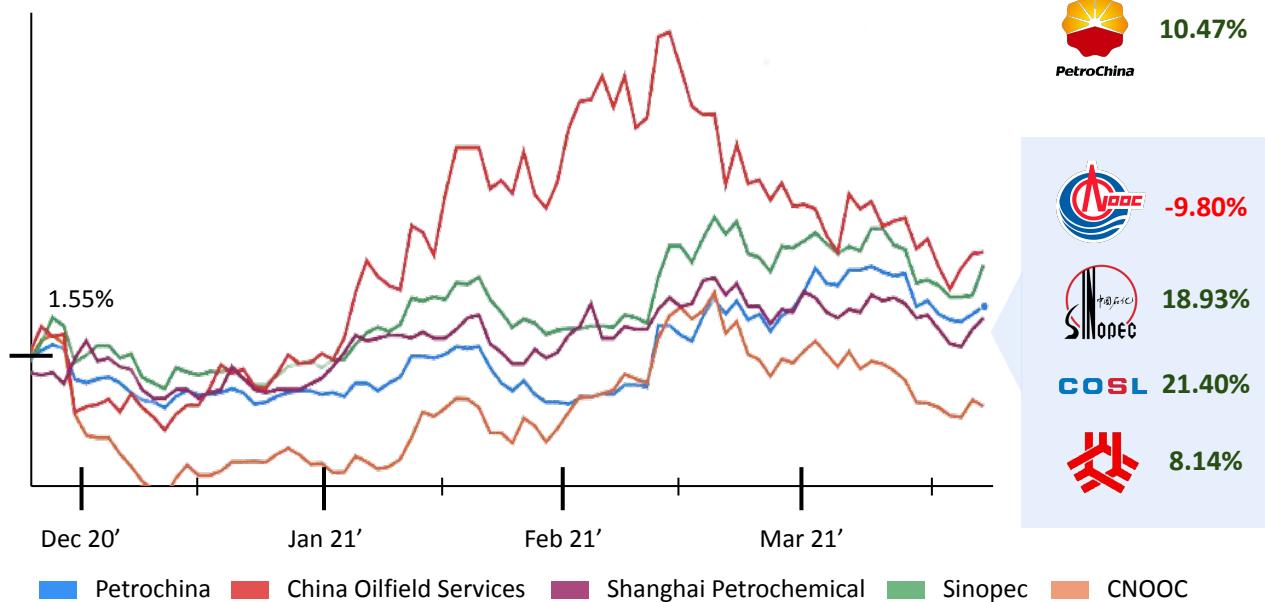
Internet of things tops the list of technologies used by organizations which has created the most profound impact on their operations...



PetroChina

Stock prices of traditional petroleum companies...

0857.HK | 0883.HK | 0386.HK | 2883.HK | 0338.HK



Stock returns..



Petrochina's finance...

Petrochina achieved robust cashflow with the net cash flows generated from the operating activities amounting to RMB 318,575 M which is relatively higher than most of its peers.

Petrochina's forward P/E ratio remains higher than its peers. Its shares trade at 36 times estimated 12-month earnings which accounts for a 53% premium versus global peers.

Petrochina trades on both, Hong Kong (0857.HK) and New York. The above graph depicts the stock returns of Petrochina as compared to its direct peers. Petrochina has thus far received a nominal amount of interest from the investors, up by 10.47% since last winter fall.

Source: Google finance ; Seekingalpha | Petrochina Oil Laggard ; Bloomberg



PETROCHINA'S OBJECTIVES AND PLANS

To build a top-class company, Petrochina will establish first-class standards for business development, reform and innovation...



Aspect	2021 Main Objectives	2021 Action Plan
 Corporate Governance	<ul style="list-style-type: none">• Improve corporate governance• Promote management upgrade• Deepen the supply front structural reform	<ul style="list-style-type: none">• Improve Petrochina's sustainability management to effectively control ESG risk• Improve corporate governance framework• Strengthen compliance management in key areas• Consistently promote the construction of internal control system• Strictly implement anti-corruption laws and regulations such as the Supervision Law
 Energy & Environment	<ul style="list-style-type: none">• Natural gas accounts for 47.8% of Petrochina's oil and gas output equivalents.• The total emissions of major pollutants fully meet the State's examination requirements.• Realize energy saving greater than or equal to 0.56 million tons of standard coal.• Water saving greater than or equal to 7.0 million cubic meters	<ul style="list-style-type: none">• Improve Petrochina's sustainability management to effectively control ESG risk• Improve corporate governance framework• Strengthen compliance management in key areas• Consistently promote the construction of internal control system• Strictly implement anti-corruption laws and regulations such as the Supervision Law
 Social Contribution	<ul style="list-style-type: none">• Promote the steady growth of national economy, earnestly fulfill social responsibilities and actively participate in public welfare undertakings.	<ul style="list-style-type: none">• Support the preparations for 2022 Summer Olympics• Maintain close communication and coordination with local governments, and support and drive the local economic and social development

Source: Petrochina's Environmental, Social and Governance Report 2020





ENTRY STRATEGY

WAYS TO EXPLOIT IoT OPPORTUNITY

Petrochina could either develop a subsidiary for IoT technology by itself, acquire an existing IoT service provider, or start a joint venture with an IoT service provider...



Develop	Acquire	Cooperate
<p>...build IoT solutions subsidiary alone</p> <p> Would allow Petrochina to develop an IoT solutions subsidiary from the ground up and be in full control of the technology...</p> <p> However, it would take time to build a subsidiary from scratch, while Petrochina's competitors might enter the IoT industry...</p>	<p>...buy an IoT solutions provider</p> <p> Would allow Petrochina to rapidly bring the IoT technology into its operations and could potentially optimize it...</p> <p> However, it might be expensive, and difficulties with integration could limit the potential upside and might require detailed deal analysis</p>	<p>...establish a joint venture or an alliance</p> <p> Would allow Petrochina to adopt and implement the IoT tech in their operations for production of cheaper products...</p> <p>However, it will involve sacrificing control over a key part in the operations and sharing the gains with the partner company as well...</p>
Feasibility of developing alone	Feasibility of acquiring a company	Feasibility of cooperating with partner
<p> Petrochina is already one of the biggest player in petrochemical industry and also has plenty of exp. in implementing technology...</p> <p> However, Petrochina would likely risk losing the opportunity for a "first mover advantage" in IoT industry.</p>	<p> Petrochina ended up with ~USD 20.5bn in cash and have more experience than most in buying and integrating companies...</p> <p> However, Petrochina might as well risk overpaying for technology that has not fully entered the market...</p>	<p> Petrochina has plenty of experience in establishing joint ventures, also in the research and development field..</p> <p> However, Petrochina would risk that its partner breaks up the agreement to exploit their tech...</p>
<p>Petrochina is greatly positioned to build an IoT company, but it would take long..</p>	<p>Acquiring an IoT service provider is very attractive, if a target can be found..</p>	<p>Adopting IoT solutions in a potential partnership is too risky, limits the upside</p>



POTENTIAL ACQUISITION TARGETS

Multiple companies have already entered the IoT market, but only **SCADACore** is far enough in IoT industry and attractive enough to be considered for an acquisition...



Company	Location	Company Background	Solutions	Operations & Finance	Verdict
Scarab		<ul style="list-style-type: none"> Scarab is a wearable sensor platform for sensing. Scarab is part of a virtuous circle that includes mobile apps on your smartphone.. 	<ul style="list-style-type: none"> UV Index Sensors Gamma Detector 3D Accelerometer 	----	<input checked="" type="radio"/>
SCADACORE		<ul style="list-style-type: none"> SCADACore is a Canadian scaleup providing optimal SCADA-based industrial IoT solutions for engineers in the oil and gas industry. 	<ul style="list-style-type: none"> Tank Monitoring Ultrasonic Sensors Water Level Alarm Callout 	<ul style="list-style-type: none"> This year, SCADACore is projected to spend \$99.4k on IT tech... 	<input checked="" type="radio"/>
FourC		<ul style="list-style-type: none"> FourC offers cloud-based database solutions and business logic functions to improve management and surveillance. 	<ul style="list-style-type: none"> Cloud System Payment Library 	----	<input checked="" type="radio"/>
CODOVIA INTELLIGENT SOLUTIONS		<ul style="list-style-type: none"> British startup Codovia integrates IoT technology in the form of cloud-based mobile application solutions 	<ul style="list-style-type: none"> Automation System Accounting System 	<ul style="list-style-type: none"> Codovia clients portfolio contains big names such as SIEMENS, Mitsubishi... 	<input checked="" type="radio"/>
					<input checked="" type="radio"/> Very attractive <input type="radio"/> Not attractive

Note*: The solutions that have been mentioned in the above slide includes only (but not limited to) the best offering by Petrochina...

Source: SCADACore (2020b) ; Startus Insights | Top 5 IoT solutions impacting the oil industry ; Fourc ; Codovia ; Scarab



ATTRACTIVENESS OF SCADACore AS TARGET

Multiple companies have already entered the IoT market, but only Toumetis is far enough in IoT industry and attractive enough to be considered for an acquisition...



SCADACore products would be a perfect fit for Petrochina...



Tank level Satellite Monitoring

- Monitor tank level
- Level notification
- Cellular gateway

Pumpjack Callout

- Monitor run status
- Vibration sensor
- Satellite monitoring

Tank level Cellular Monitoring

- Satellite transceiver
- Ultrasonic sensor
- Web-based data

SCADACore's promising scalable IoT architecture...

Cloud Service	Analytics	Integration
<ul style="list-style-type: none">• Data storage• Service broker• Workflow	<ul style="list-style-type: none">• Hot path analysis• Machine learning• Alarms	<ul style="list-style-type: none">• Business app• Reports• API gateway

SCADACore's architecture illustrates how large volumes of device and sensor data can be collected and then fed into their analytics platform. From there, structured data is passed to an integration and visualization layer, through which enterprise applications such as ERP and CRM applications can access streams of data in real-time.

SCADACore is operating in various industries...



SCADACore

- Oil & Gas
- Energy
- Security



M2M One

- Healthcare
- Security
- Utilities



WellinTech
SCADA Solutions Provider

- Oil & Gas



CO-TRUST
科創思

- Electronics
- Plastic
- Energy

SCADACore is majorly focusing on oil and gas industry. They can also potentially exploit their energy fleet for innovations.

SCADACore's tech is also quite attractive for Petrochina



SCADACore Live collects remote data from our products and packages to provide daily or hourly reports. Our charting system, while feature-rich, is also easy-to-use, allowing clients to review and analyze data with powerful trending features and historical data retrieval.



ACQUISITION SYNERGIES

Reducing management headcount, using SCADACore IoT technology and optimizing the production are the most tangible synergies that can be quantified...



Synergies based on Petrochina and SCADACore deal		Quantification	Rationale
Administration	<ul style="list-style-type: none"> Real Estate costs through shared headquarters Analyze management headcount and reduce organizational chart 	● ○	<ul style="list-style-type: none"> Strategic relevance Relevant
Research & Development	<ul style="list-style-type: none"> Operational profit from SCADACore's IoT technology Developing new tech leveraging SCADACore's expertise 	● ○	<ul style="list-style-type: none"> Inherently diff. tech Long term
Production	<ul style="list-style-type: none"> Scaling up Petrochina's production to maximize capacity without experiencing unexpected downtimes 	●	<ul style="list-style-type: none"> Relevant - To be explored further
Client Acquisition	<ul style="list-style-type: none"> Would be able to take leverage of Petrochina's reach and brand image to acquire new clients 	●	<ul style="list-style-type: none"> A USP of Petrochina is its network with clients...
Post Acquisition	<ul style="list-style-type: none"> Direct monetization of IoT data by building IoT solutions with IoT software and platform licenses 	●	<ul style="list-style-type: none"> Monetize IoT ecosystem using revenue models
Few potential Petrochina and SCADACore synergies based on their respective strategic profiles are quantized which could be periodically achieved after the acquisition takes place.		● Highest Value	○ Lowest Value
Source: Own Analysis			

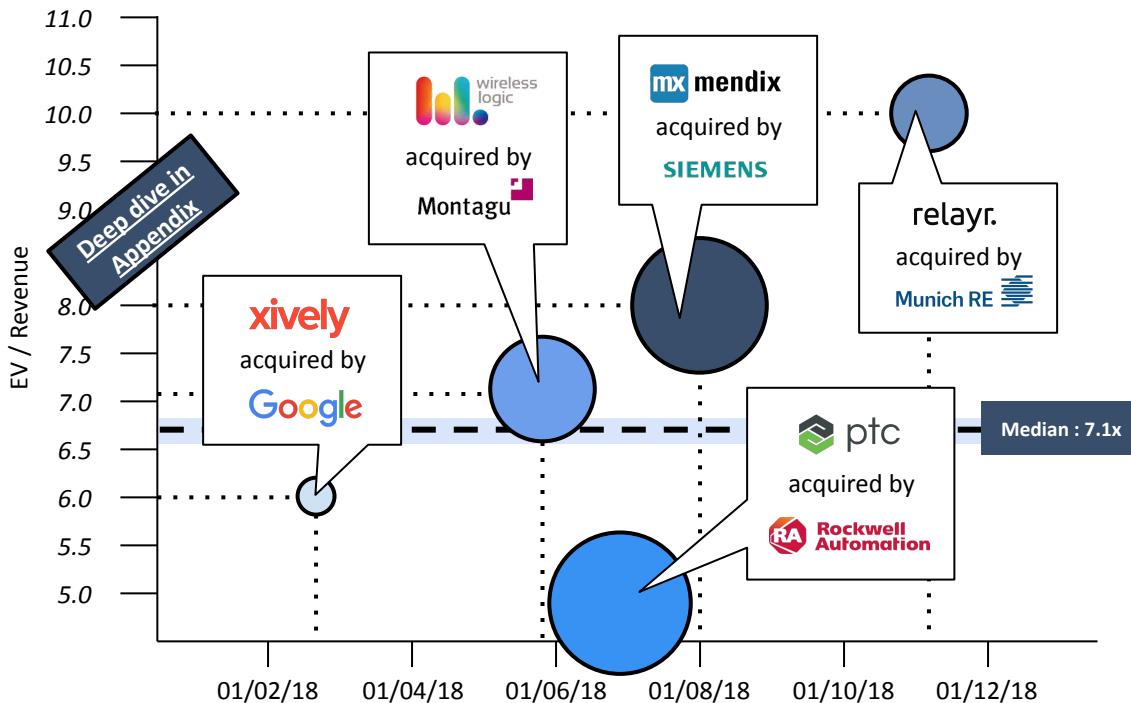


ACQUISITION SYNERGIES

Reducing management headcount, using SCADACore IoT technology and optimizing the production are the most tangible synergies that can be quantified...



Transaction multiples of previous acquisitions in IoT industry...



The EV/EBITDA is only available for 1/5 deals due to the lack of data availability and negative profitability of the targets.

Source: Acuity Advisors UK | IIoT Market Review

Conclusion...

- The transaction multiples of oil, gas and petrochemical industry are not good proxies to estimate the value of SCADACore if acquired by Petrochina.
- The target companies in these industries differ substantially when it comes to the size. The premium of each of the deals varies widely to the synergies that SCADACore and Petrochina could have.

Therefore we would only consider the **median** of the given transaction multiples of the peers



CONCLUSION

Petrochina should acquire SCADACore, an IoT solutions provider whose products and brand will have a strategic value for Petrochina in the future IoT landscape...



SHOULD PETROCHINA ENTER THE IoT 2B MARKET?

How is the IoT market situation for **Petrochina** to enter as a new player

- Despite being one of the largest players in the petrochemical industry, Petrochina is still highly dependent on other IoT service providers, due to which they are bearing losses.
- Petrochina could look for acquisition or a joint venture with a IoT solutions provider.

How much is **SCADACore** worth to Petrochina?

- SCADACore's fair value in terms of exit multiple **EV/Revenue is 7.1x**, which is the industry median considering all the close competitors in the IoT space.
- Petrochina would lose around USD 300 million on this acquisition after accounting for the synergies and convincing the board of directors.

What is the **feasibility** of an acquisition?

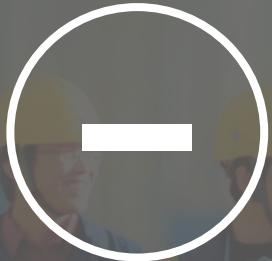
- Acquiring SCADACore in an **all cash deal** is a viable option for Petrochina given the cash in hand is sufficient to cover the deal amount.
- A merger would result in an ownership structure which is not a viable option for Petrochina.

Petrochina should buy **SCADACore**

What should be the entry **strategy** of Petrochina?

- Acquiring an existing IoT solutions provider is the most **promising** option for Petrochina. SCADACore is most **attractive target** due its product portfolio and synergies post acquisition.
- SCADACore should then be used for producing cheaper products.





APPENDIX



TRANSACTION ANALYSIS

Many enterprises in various countries are planning to implement IoT solutions in their operations, in which China tops the table...



M&A transactions...

#	Date	Target	Description	Buyer	EV/Rev	Deal value
1	15/02/18	Xively	IoT Platform	Google	7x	\$50m
2	11/06/18	ptc	Software Company	Rockwell Automation	3.4x	\$1bn
3	27/06/18	Wireless Logic	IoT Solutions	Montagu	7.1x	\$510m
4	01/08/18	Mendix	Software Platform Company	Siemens	8x	\$730m
5	04/09/18	relayr	IoT Solutions	Munich RE	10x	\$300m
Max					10x	
Average					7.1x	
Median					7.1x	
Min					3.4x	

Source: Acuity Advisors UK | IIoT Market Review



IoT MARKET HOLD SIGNIFICANT OPPORTUNITY

These platforms have proliferated and developed over the past five years and now simplify device integration and application implementation...



IoT technology	Description	Market Size	Market growth outlook	Technology maturity
Business applications	Customer- or device-facing functionality that uses insights for added value (eg, dynamic dashboard, mobile app and embedded software)	●	↑	●
Enablement platforms and cloud computing	Enablement platforms Device enablement platforms (including endpoint protection and access management) for obtaining, importing, and processing data	●	↑	●
	Analytics and visualization applications (including artificial intelligence) for insight generation, reporting and complex event handling	●	↑	●
Connectivity	Data transmission and basic device connectivity features with cellular networks, low power wide area networks, local wireless networks	●	↗	●
Devices	Sensors providing environmental information (eg, temperature, pressure, motion, lighting level, pollution) and actuators	●	↗	●

↑ Very high growth ↗ High growth ● High ○ Low



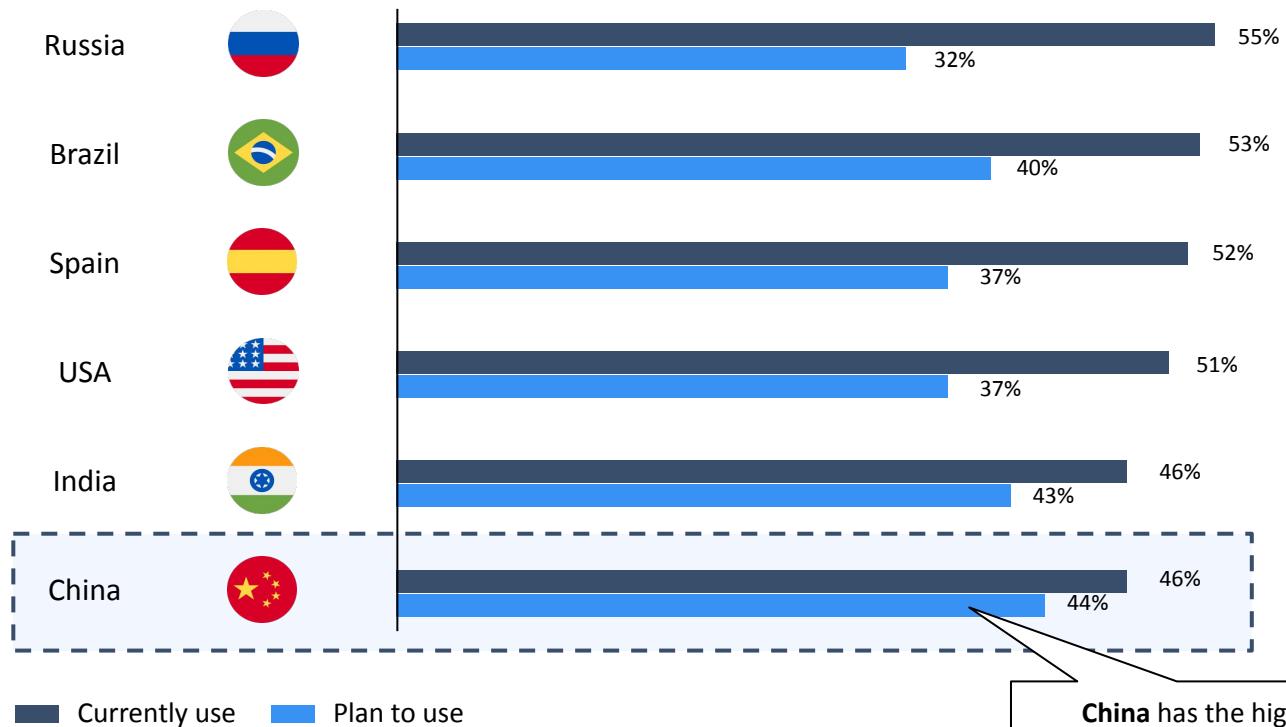
IoT IN USE BY COUNTRY

Many enterprises in various countries are planning to implement IoT solutions in their operations, in which China tops the table ...



IoT usage split based on the country demographic...

China | India | Russia | Brazil | Spain | USA



China has the highest percentage in terms of future plans to implement IoT tech..

Source: Schneider Electric | IoT Business Report 2020



CHEERS TO IoT

IoT delivers the long-standing barriers between the worlds of OT and IT, opening up better ways to operate a business...



IoT for smart, productive and profitable operations...

IoT is something that could create new business opportunities for a company in the near future



IoT is a great way to improve business efficiency



IoT is something that will deliver long-term business benefits



IoT will become the critical interface between companies and their customers



IoT is potentially the biggest innovation in supply chain management since the Internet was invented



■ Currently use ■ Plan to use

Source: Schneider Electric | IoT Business Report 2020

