UNIVERSITY OF CAMBRIDGE
Judge Business School

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CHINA REPORT
中国报告

Originated and Selected by China Advisory Council

中国顾问理事会撰选

2021 年 3 月，第三期

Third Issue, March 2021

Content
目录

Preface

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When we published our last China Report at the Sanya International Forum in December 2019, if anyone had predicted that we would enter a global lockdown in combating a deadly pandemic within days, I would have believed it to be a dark fantasy. 2020 will go down in history as a pivotal year. Historical disruptors packed the whole year with consequences that are hard to predict: a global pandemic which killed more than 2.5 million people so far, Olympic Games postponed for the first time in modern history, two US Presidential impeachment trials, the global lock-down caused the worst global financial market crash since 1929, oil contract prices went negative, Black Lives Matter protests changed the public discourse in the US and the UK, UK Exams were cancelled, a historical US presidential election with chaos at Capitol Hill, etc. Most of these events are interlinked and still ongoing. What follows? Inequality issues have been intensified, climate change causes more and more extreme weathers, high inflation is probably coming to haunt us, while most of the population is still under lock-down.

We often see unification when defending ourselves against a common enemy, but instead, we witness this pandemic being divisive. It is democracy vs demagoguery, it is mask vs non mask, it is lock-down vs liberty, it is facts vs misinformation, it is life-saving vs economy-saving, it is strategic partners vs strategic competitors. The dynamics among these elements will shape our societies as well as the world. Although the year 2020 is behind us, its legacy will continue to impact us for generations. Timing would be less important than understanding the future trends, therefore we postponed the publication of this issue from December.

2020 marks the 30th anniversary of China's capital markets. Mr Wang Boming was among the first group of students that went aboard after China's reform and opening up. He graduated from Columbia University and worked at the New York Stock Exchange. Since 1987, he actively promoted, planned and participated in the creation of China's securities market. On March 15, 1989, he co-founded the Stock Exchange Executive Council (SEEC) with support from the senior leadership of the Chinese government. The SEEC subsequently participated in the preparations for the establishment of the Shanghai Stock Exchange and the Shenzhen Stock Exchange. 30 years followed of unparalleled change and growth in both stock exchanges, with more than 4,000 companies listed and a total market capitalization over $11 trillion. We felt there would be no other person better than Mr Wang himself to share the memory and milestone of this amazing venture. We have also recorded an interview on the topic which can be found on the CJBS website.

In 2020, the Trump administration started a campaign to delist Chinese companies from US stock exchanges. Is it wise to weaponize the US capital markets? More importantly, what's next for China's Capital Markets? Dr Gong Shaolin, who started his career at the Chinese central bank and then led one of the biggest Chinese securities firms, gives his analysis on the matter. He compares the Chinese capital markets and other major markets, mapping out differences and potentials. In Chinese culture, thirty years is the age when you have your feet firmly upon the ground. This also applies to the Chinese stock market in Gong's opinion. The reforming of China's securities market continues to adapt in order to fulfil new challenges.

He discusses how a new registration-based IPO system, adopted by Shanghai's STAR Market, will make the listing process more attractive, transparent and market-oriented than it was under the older approval-based system.

In 2020, a global pandemic has changed human life. Some of those changes are irreversible. We are deeply honoured to have Professor Zhang Wenhong share his thoughts on combating Covid-19. Professor Zhang is a renowned medical doctor specialises in infectious diseases. Among many of his important roles, he is the Leader of the Shanghai's COVID-19 Medical Treatment Expert Group. He led the expert group not only successfully dealt with the crisis in Shanghai (with a population over 27 million), but has also been a key voice connecting the public and government policy. His incisive, sharp and witty style has gained tremendous trust and respect from the Chinese public. He took time during the Chinese New Year holiday and reflected on what had happened in China and the world since the outbreak. He provides insightful technical aspects and the message for the future is clear: Globalization is not the cause of the pandemic, despite our differences and variations in vaccination progress, the world needs to be re-united before normality can be restored.

2020 also put global supply chains under pressure. Evidence shows that it even sped up some of the changes in global networks as we are entering the 4th industrial revolution. While every country is looking to strengthen its own internal capabilities to be more resilient, we shall not neglect climate change which will determine our future, if not our survival. Lord Bilimoria, a British entrepreneur and a life peer, firmly believes UK and China share a common goal in a low carbon partnership. His article calls for an exciting evolution from a 'golden era' of UK-China collaboration toward a new 'green era' for the years ahead.

2020 also pushed most teaching online (in schools as well as universities). We relied in technological solutions more than ever before. This trend will affect productivity in the education sector but also the way our intelligence is developed. This will strengthen the need for human capability of thinking more independently. Professor Christoph Loch, an innovation management scholar who has served as the Dean of Cambridge Judge Business School for almost 10 years, shares his insights on the future of higher education post-covid. As humanity grows, the demand for education continues to grow despite short-term set-backs. As 'online' solutions become more sophisticated, education on a virtual platform might (at least in some cases) achieve better outcomes than face to face instruction. Professor Loch argues the transformation might turn out to be fast and disruptive even for the universities with top branding.

2020, we have witnessed that there is no quick fix either virus related or climate related. Life is a long quest. Science isn't a replacement for God, it is a quest for fact and truth. Our treasured sorrows are our wise teachers.

Thank you for your continuous support.

Xiyang Daniel He

On behalf of the Cambridge Judge China Advisory Council

前言

何玺阳
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2019 年 12 月在三亚国际论坛上我们发布了上一期的《中国报告》，如果当时有人预测我们将在几天后遭遇一场致命性的全球疫情并导致全面封锁，我当时会认定他在耸人听闻。没想到 2020 年确实大事频发。这一年的动荡充斥着难以预料的变数。简单的回忆一下：迄今为止，这场疫情已经造成超过 250 万人丧生，奥运会在现代历史上首次被推迟，一任美国总统遭两次弹劾，全球封锁也导致自 1929 年以来最严重的金融市场波动，原油期货价格一度下跌为负数，“Black Lives Matter”支持黑人反歧视的游行席卷美、英国诸国，英国取消了各级升学考试，骚乱蔓延至象征美国权力与民主的国会大厦等等。这些事件是相互关联的，并且有些仍在继续。未来不容乐观，很多矛盾需要解决：社会不平等问题由于疫情而被加剧，气候变化导致越来越多的极端天气，高通胀的阴影开始困扰经济复苏，而此时此刻大多数国家仍未彻底解除禁闭。

当面对一个共同的敌人时，通常人们会团结一致，但是相反，在抗击这场疫情的时候，全球却出现了诸多分歧。这些对立面包括：是民主还是民粹，是带口罩还是拒绝口罩，是要封锁还是崇尚自由，是追求事实还是相信谣言，是拯救生命还是维持经济，是战略伙伴还是战略竞争。这些因素之间的动态关系将影响我们的社会以及整个世界的未来。尽管 2020 年已经过去，但这些变化将影响一个时代。与其择时，不如静下心来审时度势。所以我们决定将原本要在 12 月发表的报告推迟至今。

2020 年，中国资本市场迎来了成立 30 周年的辉煌时刻。王波明先生是改革开放后最早的一批留学生之一。他毕业于哥伦比亚大学，曾在纽约证券交易所供职。自 1987 年以来，他积极推动，计划并参与了中国证券市场的创建。1989 年 3 月 15 日，在中国政府高层领导的支持下，他参与建立了证券交易所研究设计联合办公室成立（联办）并任总干事。联办随后参与了上海证券交易所和深圳证券交易所的筹备设立。30 年沧桑巨变，两个证券交易所都取得了举世瞩目的变化和增长，已有 4000 多家上市公司，总市值也超过了 11 万亿美元。综上所述，没有比王教授本人更好的人选来分享这些精彩的过程和里程碑了。我们同时还就此话题连线采访了王教授，该采访视频可以通过剑桥大学商学院官方网站浏览。

2020 年，特朗普政府通过《外国公司问责法案》等政治活动，威胁在美上市中国国有企业，迫使他们退市。将美国资本市场作为政治武器是否明智？更重要的是，中国资本市场的下一步发展何去何从？宫少林博士曾在央行工作，之后又带领招商证券 16 年，在第一线见证了中国证券市场的风风雨雨。作为第一代卷商领导者，他在此分享了对中国证券市场 30 年的解读。他把中国资本市场和其他主要市场做了对比，并指出了差异和机遇。中国人讲，三十而立。宫博士提到而立之年的中国的证券市场还是在不断改革来适应新的挑战。他特别提到了上海证券交易所科创板采用的新的注册制，其优势在于将放宽更多的科技型企业，使中国资本市场更具吸引力，更加透明和市场化。中国证券市场之路任重道远。

2020 年，一场新冠疫情肆虐全球，改变了人类的生活。有些变化甚至是不可逆的。我们非常荣幸地邀请到张文宏教授来分享他对抗疫的心得。张教授是一位知名的传染科主任医师。在他身兼的要职中，最广为人知的便是他是新冠疫情上海医疗救治专家组组长。他所带领的专家团队不仅成功地应对了疫情对上海这座接近 2700 万人口的国际大都市所造成的种种危机，而且他所代表的专家的呼声成为了公众与公共政策之间的桥梁。张教授语言精辟，犀利和诙谐的风格赢得了中国公众的高度信任和尊重。他在农历新年假期期间特意为我们的《中国报告》从专业视角回顾了自新冠爆发以来中国和世界的抗疫过程。他的文章讲述了疫情爆发的来龙去脉，而且提供了简明扼要的技术分析。他的倡议也非常明确：全球化并不是疫情失控的元凶，疫苗是世界重新开放的唯一渠道。但除了疫苗以外，各国必须重新团结一致，否则疫情过去之后世界将很难重返正常的全球化轨道。

2020 年，这场疫情给全球供应链带来前所未有的挑战。有证据表明，随着我们进入第四次工业革命，加上疫情的对生产所造成的不确定性，两者加速了全球供应链网络的变化。各国都在积极寻求如何改进本国内部生产力以增强抗灾能力。与此同时，我们呼吁不能避重就轻而忽视气候变化，因为气候变化将决定我们的未来，甚至是人类文明延续的关键。英国著名企业家，比利莫利亚勋爵坚信中英两国在低碳伙伴关系中有着共同的目标。他的文章预见中英合作将会从原先的“黄金时代”演变为更长远、更激动人心的“绿色时代”。

2020 年，全球封闭推动了大规模的教学（无论是小学，中学还是大学）转为线上。教育比以往任何时候都更加依赖于技术的解决方案。这种趋势将影响教育产业的生产力，也将影响人类自身智能发展的方式。当下，人类更加需要培养独立思考的能力。克里斯托夫·洛赫教授作为创新管理学者，担任剑桥大学嘉治商学院院长也近 10 年，他分享了对摆脱疫情后，高等教育将如何发展的观点。随着人类社会不断进步，尽管难免有短期的挫折，对教育的需求不会减少。随着“在线”解决方案变得越来越成熟，在虚拟平台上进行授课（至少在某些情况下）可能会获得比面对面教学更好的结果。洛赫教授认为，即使对于拥有顶级品牌的大学来说，也应居安思危，因为这种转变在提速并且具有颠覆性。

2020 年，我们意识到无论是传染病还是气候问题都没有快速解决方案。生存就是追求一个的过程。科学不是上帝的替代品，而是对事实和真理的不断探究。一切挫折的宝贵之处就是能让我们最终明心见智。

在此，我谨代表剑桥大学嘉治商学院中国顾问理事会，感谢我们诸位杰出的作者！感谢各界朋友一贯的支持与帮助！

何玺阳

剑桥大学嘉治商学院中国顾问理事会

中国资本市场

A Brief Introduction of China's Capital Markets

20 世纪 80 年代后期，随着农村改革初见成效，中国经济体制改革的重点从农村转向城市。1988 年，当时刚从美国学成归来的王波明等起草了《中国证券市场创办与管理的设想》，11 月，在中央高层听取汇报后，资本市场的筹备工作以“民间发起，政府支持”的方式启动，1989 年 3 月 15 日，“证券交易所研究设计联合办公室”（后更名为“中国证券市场设计研究中心”，简称“联办”）正式成立。1990 年 12 月，沪深两个证券交易所正式成立，同月，“联办”以美国 NASDAQ 计算机联网交易为蓝本，设计建立的“STAQ”（证券交易自动报价系统），也实现了国内六个城市 18 家公司通信联网交易。以“两所一网”为标志，中国证券市场就此建立了起来。证券市场的建立，牵一发而动全身，推动着以财税改革、投融资制度改革和企业制度为代表的经济体制改革逐渐深化，自此，中国资本市场在推动中国改革开放发展的历史进程中，在中国经济发展和金融运行中，日益发挥着重大作用。2020 年，中国资本市场已经步入第三十个年头。三十年来，在改革与开放的双重动能下，中国资本市场从无到有、从小到大，已经成为全球第二大股票市场和债券市场。

In the late 1980s, with the initial success of rural reforms, the focus of China's economic system reform shifted from rural to urban areas. In 1988, Wang Boming, who had just returned after finishing school in the United States, participated in drafting the *Vision of the Establishment and Management of China's Securities Market*. After a debriefing about the *Vision* to the central senior leadership in November the same year, China's capital market, initiated by private organizations, received huge governmental support and was in development. On March 15, 1989, the "Securities Exchange Research and Design Joint Office" (later renamed "Stock Exchange Executive Council", referred to as "Joint Office") was formed. In December 1990, the Shanghai and Shenzhen Stock Exchanges were established. In the same month, the Joint Office created STAQ (Security Trading Automated Quotation System) based on the NASDAQ internet-connected trading system. In the meanwhile, 18 companies in six domestic cities were connected to the network for securities trading. The establishment of the two stock exchanges and one network marked the formation of China's securities market, which led to far-reaching impact on – China's economic system reform represented by fiscal and tax reform, investment and financing system reform, and corporate system was further deepened. Since then, China's capital market has been playing an increasingly significant role in promoting China's reform and opening up, economic development and financial operations. The year 2020 marked the 30th anniversary of China's capital markets development. Over the past three decades, fuelled by both reform and opening up, China's capital markets have grown from scratch and risen to the second largest stock market and bond market in the world.

忆中国证券市场 30 年

王波明，剑桥大学嘉治商学院中国顾问理事会成员

王波明 教授

总编辑

《财经》杂志

中国证券市场研究设计中心（联办）创始人；

中国证券市场重要的发起和创建者之一；

国内财经媒体的思想和意见领袖之一；

组织并承办了多次中国与世界政商领袖之间的对话与接触。

若以 1990 年 12 月沪深两市的建立为标志，到 2020 年 12 月，新中国股市已然 30 年。

中国人的血液里，长久流延着股市的基因。

到江苏南通看看吧，看看 100 年前的张謇、大生纱厂和大生股票。南通面临长江，当年几近“断头路”，但依然没能割断中国人资本市场的血脉。

不论是在中共偏远的苏区，还是在大上海十里洋场，不论是在市井百姓的嘴里，还是在小说《子夜》的字里行间，股票都是常客。

然而，新中国建立后，股市戛然而止。当年的中国选择了计划经济治国之路，大一统的国有体制不再需要股票这玩意儿啦。

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1978 年中国改革开放，向市场经济回归，股市的恢复自然成为题中之义。

像小岗村农人的拼死分田自救一样，市井朝野也兀自闹起了股票。

当年的故事令今人惭愧。谁能在中南海里卖股票？谁能把个烂山芋一样的股票折腾到美国上市？是的，就是2007年退市的华晨金杯股票。赵希有，仰融，这些人将来历史自会有评说。

有股市血脉的喷张，有海外精英的呼啸，有地方政府的竞争，还有当时国际国内政治经济环境的催发，1990 年 12 月，沪深两市忽然就破土而出。随之破土而出的还有中国证监会。一个新建的政府监管机构，

开办经费竟然没能及时到位，竟然要租用饭店办公。一切都来得那么突然，有些人的想法不敢直说：开放的市场没有回头路可走。

证券市场重要的时刻到来了，这就是“327 国债”事件。与其说这是商业大亨万国证券与官家买卖中经开的博弈，莫如说这是以尉文渊所代表的上海地方利益，尝试着与中央以及其他（它）地方的利益的划分。

327 国债事件后，中央政府加强了对沪深两市的掌控，证券市场的利益分配权限更多地向中央倾斜。

中央高层在证券市场上的作用不可忽视。股市开张前，小平前辈的一句话“大不了再关了嘛”打消了无数人的顾虑，而张劲夫、陈云等老一辈领导人在不明觉厉时亦大胆支持实在是难能可贵。传言时任上海市长的朱镕基实在是因为要开发浦东手里没钱才拼命鼓捣成立上交所，成就一段实用主义美好传说。

当然，看得见的手有时也伸的在点长。在 30 年的历史中，《人民日报》曾两发评论员文章。1996 年 12 月的第一篇是砸市的，朗朗上口：“政府要把经济搞好是真，但绝对不会在股市暴跌时去托市，也托不起市。投资者对此不能抱有任何幻想。”然而，在 1999 年 6 月的第二篇文章中，《人民日报》就号召大家《坚定信心，规范发展》了，并创新了一个名词“正常的恢复性上升”。

这中间发生了什么？1997 年 9 月 12 日，中共十五大关于股市有两个极重要的信息。先是改变了公有制必须是国有独资的概念，混合经济也是公有制。接下来，一直让大家头疼的国企改革有了更明确的说法，就是股份制改造、兼并收购、资产重组等。

实施这些说法，股市是最好的运作场所。

如果说，1990 年中国恢复证券交易所，当时还有试验的意思，试不好还琢磨着可以关，到 1997 年 9 月的十五大，股市的重要性似乎才真正有点感觉了，股市真的有配置资本的功效，特别是给国有企业配置资源，真能给领导排忧解难了。

之后，便有了周小川国有股减持的八面威风，以及后来的黯然退场。

周小川试图纯正股市的血统。他说，要更多依靠市场来发展股市，证监部门不调控股票指数的涨落，更不能将调控股票指数作为工作目标或工作方针……

有评论说，中国股市是为国企脱困服务的，是权贵资本主义。

但这不是股市独有的。2001 年中国加入 WTO，中国社会危机感加深，高层号召国企做大做强，时不我待。在这种氛围里，股市不能旁观。

证监会面临的问题，既有历史的，也有现实的：国有股法人股不流通，这是当时政治制度和理念决定的；上市公司的虚假烂账成堆，但哪一家背后都有强大的红头文件；市盈率虚高泡沫泛滥，这是各个利益集团共同的愿望，非证监会一家所能左右；甚至一咬牙把那坏人送上公堂吧，人家法院还不受理……

对于这样一个市场，该用行政力量去清淤，还是听凭市场折腾而净化？前进还是妥协？改革还是发展？救命还是治病？眼前还是长远？

2005 年 5 月长假后，第一批股权分置改革全流通股改 4 家试点公司出发。但马上，最危险的时刻来临了：6 月 6 日 11 时 04 分，一笔 2000 手宝钢的卖单抛出，沪指应声砸到 998 点，击破 8 年来的千点大关。6 月 19 日周日晚间，没有任何征兆，股权分置改革第二批试点 42 家上市公司启动，远超此前市场预料的规模。到年底，股权分置改革基本上闯过关卡，尚福林“开弓没有回头箭”的说法已广为传播。

深沪股市建立前的 1988 年 8 月，诺贝尔经济学奖获得者弗里德曼来深发展参观，末了他问：国营控股的股份制是否能真正发挥股份制的作用？中小私人股东有没有话事权？利益能否得到保证？你们银行领导是谁任命的？是政府还是股东？……

30 年后的今天，这些问题依然还是个问题。

接下来，问题仍在延续、变异、强化。2015 年的大股灾，“他们是冲着五星红旗来的”；宝万之争，他们是害人精，打国企的主意；长生生物，转了多少年，仍在精力旺盛地作假谋财……

改革开放，中国最大的变化是中国人的机会多了，而证券市场，按高西庆的说法，是全社会惟一一个由投资者自主投资的场所。

或说是大而不强，或说是繁而无序，不论如何，三十年跌荡，看眼下，问题多多；回头看，进步不小；望远方，信心就是黄金。

不管是股民、资本、投机者，或是看客、监管者，甚至是牺牲品，所有股市的参与者，都应得到尊敬。

The Thirty-Year Evolution of China's Securities Market

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One of the important initiators and founders of China's securities market.

He is known as the Chinese financial and media thought and opinion leader.

He has initiated and launched many engagements among senior political and business leaders between China and the world.

If starting off with the establishment of Shanghai and Shenzhen stock markets in December 1990, the stock market of New China has been 30-years-old by December 2020.

The genes of the stock market have been in the blood of the Chinese people for a long time.

Let's go back to Nantong, Jiangsu Province 100 years ago when Zhang Jian founded Dasheng Yarn Mill and issued Dasheng Shares. Blocked by its geographical location at the estuary of the Yangtze River, there seemed no way out for Nantong at that time. The capital market, however, found its fertile soil here to thrive in China.

Wherever in the remote Soviet area of the Communist Party of China, or in the foreign concessions in Shanghai, the concept of stocks might spark a conversation. Even ordinary people mentioned it a lot. In the novel «Midnight» (a 1933 novel by Chinese author Mao Dun) , stocks were also a familiar concept.

However, after the founding of New China, the stock market came to a dead stop. The planned economy was once the best cure for the country at that time, the unified state-own system meant the concept of stocks were no longer needed.

In 1978, China started reform and opening up, and soon after transformed to a market-oriented economy. The establishment of a stock market naturally re-discovered as a meaningful topic.

At that time, farmers in Xiaogang Village took great risk and secretly subdivided their common farmland led to dramatic increase in the production of grain, while the government and the business market were busy with the concept stocks.

Some of the stories might sound trivial and ridiculous now. For instance, who 'sold' the idea of stocks in Zhongnanhai (central headquarters for the Chinese Communist Party and the Central government)? Who can take a premature Chinese company to be first listed in the United States? It turned out the first US-listed Chinese firm was the China Jinbei Automobile, which was delisted in

2007. Some early participants such as Zhao Xiyou and Yang Rong were highly controversial. History or mystery will be decided by historians.

Coinciding with a favorable international and domestic political and economic environment, the great thrust from elites graduated overseas and competitions among local governments, China's capital markets welcomed its historic moment in December 1990 - Shanghai and Shenzhen stock markets opened. It all happened so suddenly that a new government regulatory agency - the China Securities Regulatory Commission (CSRC) was established with no adequate budget. The first office of the commission was set up in a rented hotel room. However, we all knew there was no turning back from an opened market economy.

Another historical event worth mentioning was the "327 Treasury Bond Incident", which all started when Chinese securities brokers were allowed to conduct proprietary trading in Treasury bond futures at the Shanghai Stock Exchange in 1992. On the surface, it looked like a game between the speculator (Wanguo Securities) and the regulator. However, it also depicted how Shanghai local government tried to protect its own interest by dividing interests of the central government and other regional governments.

After the "327 incident", the central government strengthened its control over both the Shanghai and Shenzhen stock markets, and the authority of the securities market was more in the hands of the central government.

We cannot ignore the immense support from the senior leadership in the development of the securities market. Before the opening of the stock markets, Deng Xiaoping said "it would not be a big deal to close it again" which dispelled the worries of many people who were biased against the idea. Zhang Jinfu, Chen Yun and other leaders also showed their great endorsement when they did not know if it would be a success. It was rumored that Zhu Rongji, then mayor of Shanghai, set up the Shanghai Stock Exchange just because he had no capital to develop Pudong area. This turned out to be a fruitful venture and a great story of pragmatism.

In China, we often joke that the government has a 'visible hand'. The hand sometimes inevitably went too far. In the past 30 years, People's Daily has published two commentator articles. The first article in December 1996 was a smash on the market, frequently quoted from the article "it is true that the government wants to improve the economy, but it will never play the role to rescue the market if it crashes, nor can it afford it. Investors should not have any illusions about this." However, in June 1999, People's Daily wrote the second article and called on public to "Strengthen Confidence and Standardize

Development" in the stock market and coined the term "normal restorative rise" .

What happened in this period? On September 12, 1997, the 15th CPC National Congress gave us two extremely important messages about the stock market. First of all, it changed the concept that public ownership to be wholly owned by the state, saying that the mixed economy was also part of the public economy. It also went further with clear guidance in order to reform of state-owned enterprises. This included shareholding reform, mergers and acquisitions, asset restructuring, and so on.

The stock market was the best place to implement this reformation.

When China resumed the stock exchange in 1990, it might be experimental and would be closed if the results were unsatisfying. It was until the 15th CPC National Congress in September 1997 that the importance of the stock market was highlighted. The stock market started to work for capital allocation, especially for the allocation of resources to state-owned enterprises.

This stage was followed by the reduction of state shares with the high-profile advocacy by Zhou Xiaochun (then Chairman of the CSRC).

Zhou Xiaochuan tried to enhance the independence of the stock market. He said that it is necessary to develop the stock market relying on the market itself, and the securities regulatory authorities shall neither regulate the rise and fall of the stock index, nor regulate the stock index as a work goal or policy.

Some critics said that China's stock market serves to extricate the state-owned enterprises in particular and is a kind of 'crony capitalism'.

However, this is not unique to the stock market. Since China's accession to the WTO in 2001, the country's sense of social crisis has intensified. The senior leadership has been calling on state-owned enterprises to become bigger and stronger. Under this circumstance, the stock market cannot stand on the sidelines.

CSRC was in the face of both historical and contemporary issues. The non-circulation of state-owned shares and legal persons shares was caused by the political system and ideology at that time. Even though there were piles of false accounts, listed companies all had a strong backing of official documents. The insanely high price-to-earnings ratio was what all interest groups bucked for and was beyond the control of CSRC alone. What was more, the court did not accept the lawsuit against these companies…

How to control such a market? By administrative power or the market? By promotion or compromise? By reform or development? And which is more important, the short-term benefits or the long-term interests?

After the May Day Holiday in 2005, the first batch of non-tradable shares reform was piloted on four companies. A sell off crisis came immediately: at 11:04am on June 6, an order of 2000 lots of Baosteel was sold. SSE Composite Index fell sharply to 998 points, below 1000 points (the first time in past eight years). On Sunday evening June 19, without any warning, the second batch of non-tradable shares reform involving 42 listed companies was launched, far exceeding the scale expected by the market. By the end of the year, the non-tradable share structure reform has basically broken through the hurdle. Shang Fulin's (then Chairman of the CSRC) famous quote "there is no turning back arrow" was widely quoted.

In August 1988, before the establishment of the Shenzhen and Shanghai Stock Exchanges, Nobel Laureate Milton Friedman visited Shenzhen. At the end of his visit, he questioned: can the state-controlled shareholding system have a meaningful role in the shareholding system? Do medium and small private shareholders have a say? Are their interests guaranteed? Who appoints the board of a state-own bank? Is it the government or shareholders?

30 years later, these problems are still relevant.

Problems remain, mutate, and intensify. The year 2015 saw a great crash. In the battle between Baoneng Capital and Vanke Real Estate, the interest of state-owned enterprises wasn't efficiently protected. Changsheng Biotechnology, after many years of transformation, was still able to manipulate various accounts in order to gain from the market.

The greatest benefit from China's reform and opening up is more opportunities for Chinese people. Gao Xiqing (former Vice Chairman of the CSRC) once said, "the securities market is the only place in the society invested by investors independently."

China's securities market is big but not strong, prosperous but disorderly. Though there are still a lot of problems, great progress has been made during thirty years' of ups and downs. Looking to the future, we see huge potential for improvement.

It is 30 years on. All participants in the stock market, whether they are investors, capitalists, speculators, onlookers, regulators or even victims, deserve respect.

而立之年，中国证券市场再出发

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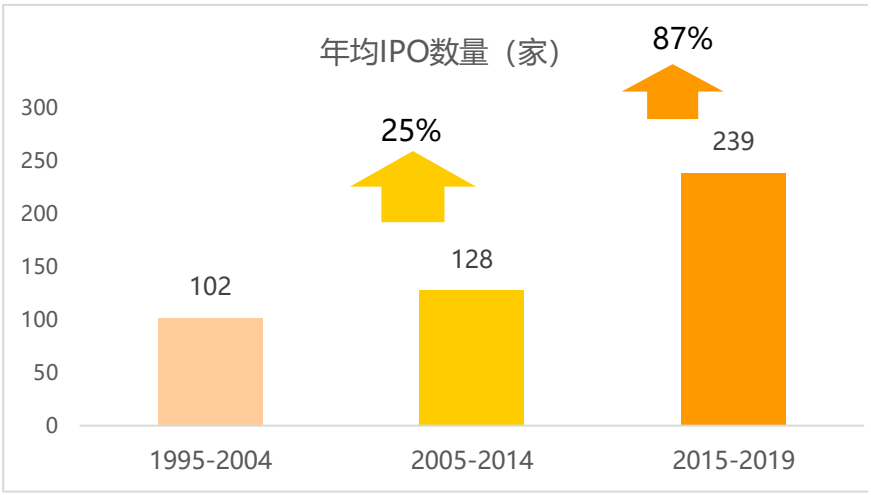
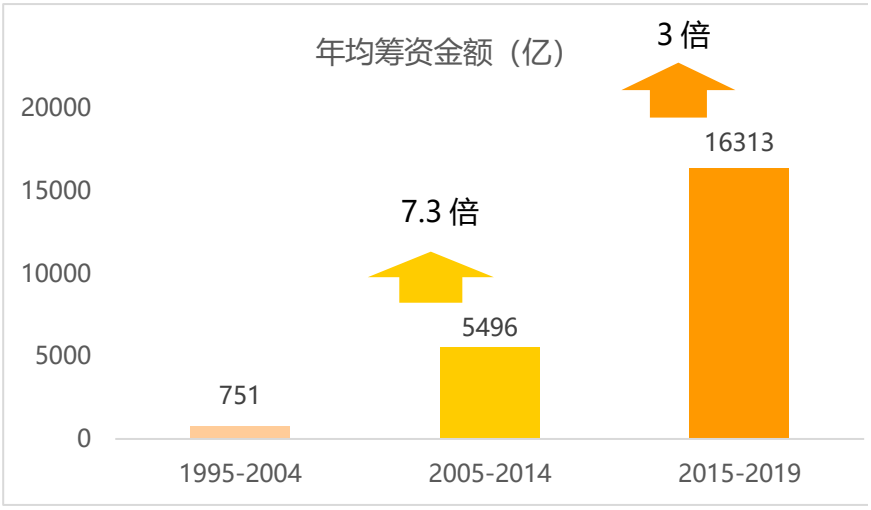
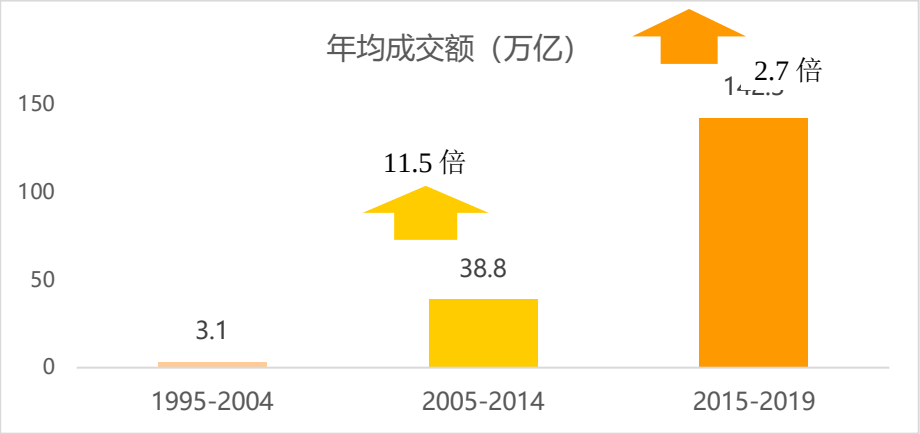
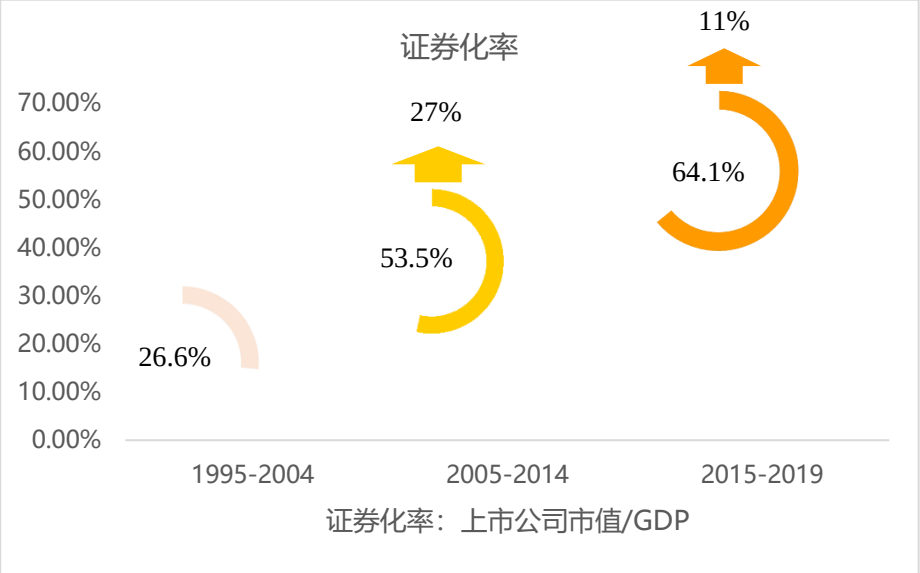
而立之年，中国证券市场服务实体经济的能力已经显著提升。1990 年深圳和上海两个证券交易所的建立标志着新中国证券市场的诞生。从那时算起，中国证券市场已经历过青春期，到 2020 年正式步入而立之年。经过 30 年的发展和成长， 中国证券市场特别是股票市场服务实体经济的能力已经显著提升。让我们看几个数据。

中国证券市场 30 年演变









证券市场刚起步的几年各项指标规模尚少，我们以 1995 年开始纳入统计测算。一是，年均 IPO 数量，首发上市公司数量逐步增加。1995 年至 2004 年的十年，中国股票市场的 IPO 数量为年均 102 家；2005 年至 2014 年的十年，上升到 128 家，增长 25%；2015 年至 2019 年，年均 IPO 家数上升到 239 家，增长 87%。二是，年均筹资金额（含 IPO 和增发等）稳步提高。1995 年至 2004 年的十年，中国股票市场的年均筹资额 751 亿元；2005 年至 2014 年的十年，筹资额上升到 5486 亿元，增长 7.3 倍；2015 年至 2019 年，年均筹资额上升到 16313 亿元，进一步增长 3 倍；三是，市场深度逐步拓展，股票市场的成交额上台阶。1995 年至 2004 年的十年，中国股票市场的年均成交额 3.1 万亿元；2005 年至 2014 年的十年，成交额上升到 38.8 万亿元，增长 11.5 倍；2015 年至 2019 年，年均成交额上升到 142.3 万亿元，进一步增长 2.7 倍；四是，证券化率即上市公司市值与 GDP 之比提升。1995 年至 2004 年的十年，

中国股票市场上市公司市值与 GDP 之比为 26.6%；2005 年至 2014 年的十年，市值与 GDP 之比上升提升近 27 个百分点；2015 年至 2019 年，市值与 GDP 之比上升到 64.1%，进一步提升近 11 个百分点。

中国有句老话，叫做三十而立。意思是人到三十岁，才能建立稳定的价值观和做事的原则。到 2020 年，中国股票 市场已到而立之时，自身的能力已得到显著的提升，未来的 10 年乃至 20 年，正是宏图大展的时机。那么，路在何方？未来的路怎么走？是我们必须回答问题。

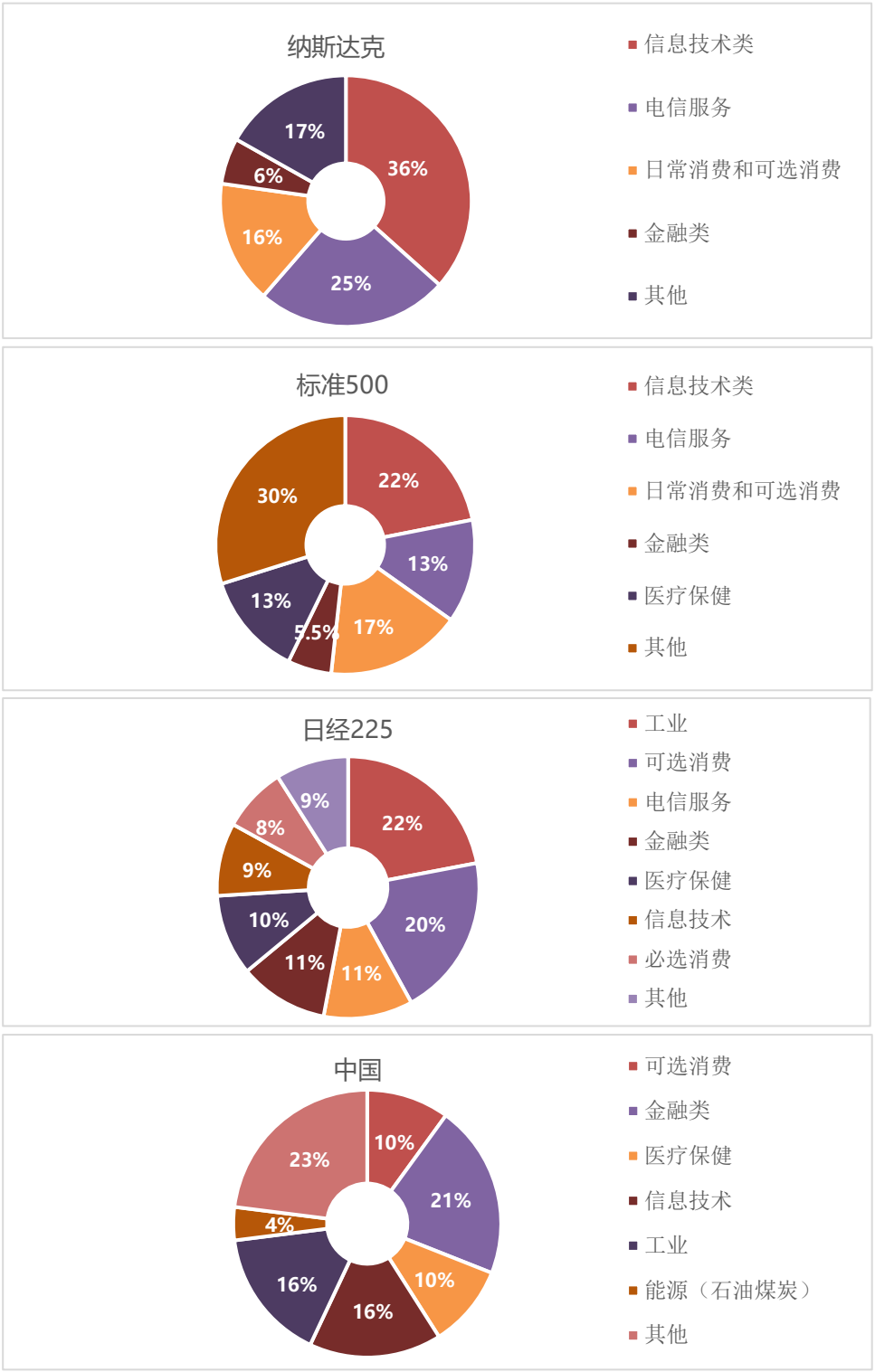
看中国股票市场的使命和担当。2020 年中国股票市场市值已成为全球排名第二大的市场，当年新发股票筹资额全球排名第一位。中国证券市场的使命，就是要成为全球最有效率，最具吸引力，品种齐全，交易便捷，成长性好的全球市场，为中国和全球投资者提供最优质产品。为达到这一目标，需要决策层和市场参与者的共同努力，持之以衡地把市场建设好。

中国股票市场还承担着推动中国经济转型升级的历史使命，要大力发展直接融资，进一步提升证券化率，降低整个社会的杠杆率。2020 年中国证券化率为 75%，对比美国等成熟市场还有不少的空间，这需要鼓励更多的优质企业上市，通过并购重组增厚上市公司的每股盈利，把市值不断做大。

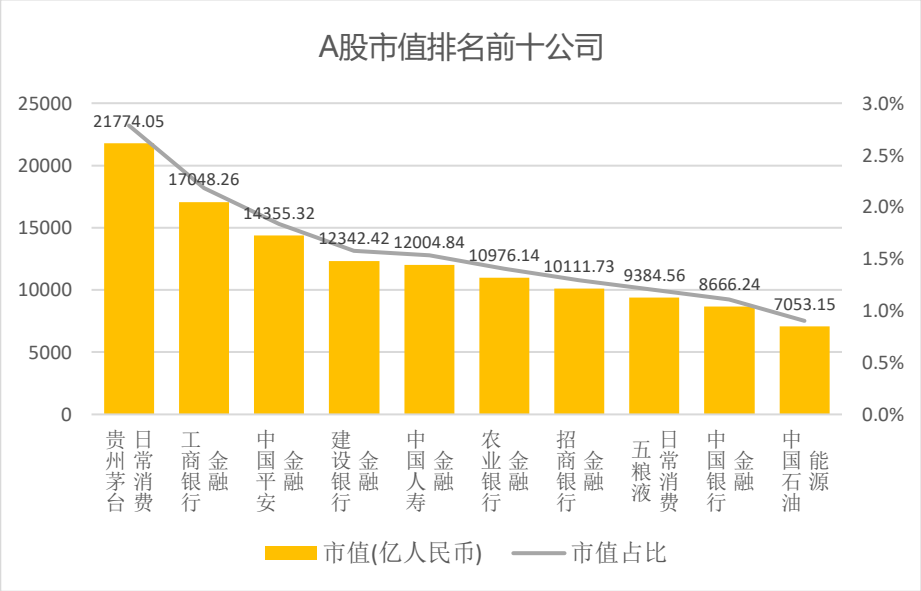
从中外上市公司产业结构对比看未来中国股票市场的发展方向。

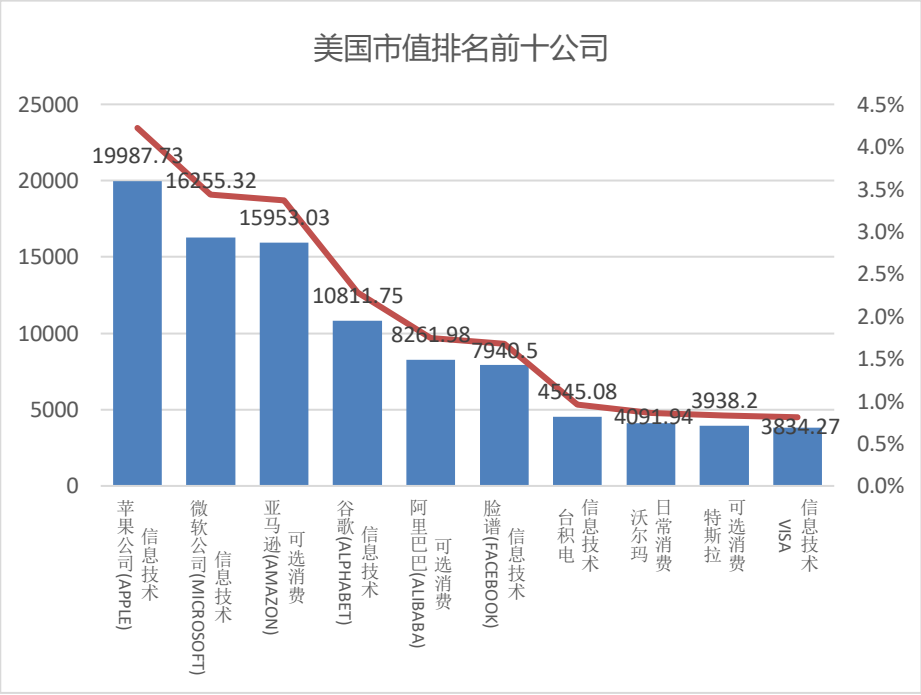
以 2019 年末的市值来看，美国纳斯达克市场中，代表高新技术行业占比靠前。信息技术类公司市值占比最高，占近 37%； 其次是电信服务，占比近 25%；日常消费和可选消费合计占比超过 16%；金融类公司行业市值占比较低，为 5.5%。同样， 代表大市值上市公司的标普 500 成分股中，信息技术类公司市值占比最高，接近 22%；日常消费和可选消费合计占比超过 17%；电信服务和医疗保健类上市公司紧随其后，市值占比均在 13%左右；金融类公司行业市值在标普中占比较高，同样接近 13%。日经 225 成分股中，工业类公司市值占比最高，近 21%；可选消费类公司市值占比排名第二，近 20%；电信服务和金融并列第三，均接近 11%；跟随其后的是医是医疗保健、信息技术和必选消费，占比分别为近 10%、9%、8%。对比而言，在最近的数年尽管中国股票市场的产业结构已跟随中国经济转型的进程出现显著的改变，比如能源板块和金融板块的市值占 比已显著下降，信息技术产业和消费品板块的市值占比已明显上 升，但未来仍可能延续以下趋势：一是，金融类上市公司的占比 将从目前的近 21%进一步回落；二是，信息技术和工业两大行业的市值占比为 16%，未来有望进一步上升；三是，伴随消费升级，可选消费的占比将较目前的 10%有所上升；四是，未来中国人均收入进入高收入阶段后，医疗保健上市公司的市值占比也将较现在的 10%左右的水平上升；五是，作为新基建的有机组成部分，随着 5G 技术的发展和应用，电信服务业的市值占比仍有提升空间。

各国股市市场结构对比


纳斯达克
36%
25%
16%
6%
17%
信息技术类
电信服务
日常消费和可选消费
金融类
其他
标准500
22%
13%
17%
5.5%
13%
30%
信息技术类
电信服务
日常消费和可选消费
金融类
医疗保健
其他
日经225
22%
20%
11%
11%
10%
9%
8%
9%
工业
可选消费
电信服务
金融类
医疗保健
信息技术
必选消费
其他
中国
10%
21%
10%
16%
16%
4%
23%
可选消费
金融类
医疗保健
信息技术
工业
能源（石油煤炭）
其他

从中国和美国股票市场市值排前 10 位公司行业对比看， 美国市场基本以科技公司为主，中国市场除了金融就是白酒公司，差异太大。这其中原因有，过去中国股票发行不接受不盈利的企业，使互联网应用的科技公司远赴他国上市，不能不说是中国股票市场的遗憾。





注册制是进一步提升中国股票市场服务实体经济能力的关键。从发达资本市场的经验看，如果要想使得一国的股票市场真正成为其经济的晴雨表，就要使得市场中的上市公司能够对其经济结构有一个真实全面的代表性，这一点相当大程度上与其实行注册制的发行上市制度有密切关系。

未来，中国的股票市场如果更充分发挥资本市场发现科技创新企业，合理定价和交易风险的作用，注册上市制度的改革首当其冲。回顾中国股票市场的发行上市制度，走过了1990年至2001年，十年的审批制；2001年至 2020年，二十年的核准制；再到 2020年 3月1日起施行《中华人民共和国证券法》后全面推行的证券发行注册制度，可以说不断成长，不断改革，不断向发达资本市场通行的规则靠拢。在过去的审批制和核准制下，每年发行上市公司的数量和融资规模要按照计划审批，哪些公司能够获得发行上市的资格，要由各省、自治区、直辖市、计划单列市和国家有关部委决定或推荐，此外上市公司股票发行的价格，募资规模等等要素也都存在较强的计划和审批色彩。在注册制条件下，按照中国证监会易会满主席在2020年10月15日受国务院委托向全国人大常委会会议的报告中所概括，注册制的架构包括：“一个核心、两个环节、三项市场化安排”。“一个核心”就是以信息披露为核心，要求发行人充分披露投资者作出价值判断和投资决策所必需的信息，确保信息披露真实、准确、完整。“两个环节”就是将审核注册分为交易所审核和证监会注册两个环节，各有侧重，相互衔接。“三项市场化安排”为设立多元包容的发行上市条件、建立市场化的新股发行承销机制、构建公开透明可预期的审核注册机制。

从上海交易所科创板的注册制实践看，改革的成效显著。2020 年前三个季度，科创板注册上市公司数达到175家，在全球排名第一，远远超过排名第二的美国纳斯达克市场的126家。2020年8月24日，创业板注册制改革正式启动，首批18家企业鸣钟上市。8月24日—10月16日期间，共有38家企业在创业板注册上市，占2020年创业板上市公司总数的46.3%（截至10月16日，创业板2020年上市公司家数合计为82家），较去年同期（仅4家）增长8.5倍；较科创板同期上市公司多出12家。

可以预计，随着注册制在创业板等存量市场的推行探索和实践，未来将按照从科创板到创业板再到全市场，三步走的战略稳步而坚定推行。这使得具备竞争力和持续经营能力的科技创新企业上市的路一定会越走越宽，越跑越快。

创业板主要发行上市条件一览表

主体资格	1. 依法设立且持续经营三年以上的股份有限公司。
	2. 发行人应当主要经营一种业务，生产经营活动符合法律、行政法规和公司章程的规定，符合产业政策及环保政策；
	3. 发行人最近两年内主营业务和董事、高级管理人员均没有发生重大变化，实际控制人没有发生变更。
规范运作	1. 股权清晰。控股股东和受控股股东、实际控制人支配的股东所持发行人的股份不存在重大权属纠纷；
	2. 依法建立健全股东大会、董事会、监事会以及独立董事、董事会秘书、审计委员会制度、股东投票计票制度；
	3. 内部控制制度健全；
	4. 发行人及其控股股东、实际控制人最近三年内不存在损害投资者合法权益和社会公共利益的重大违法行为。
财务与会计	1. 最近两年连续盈利，最近两年净利润累计不少于一千万元；或者最近一年盈利，最近一年营业收入不少于五千万元。净利润以扣除非经常性损益前后孰低者为计算依据；
	2. 最近一期末净资产不少于二千万元，且不存在未弥补亏损；
	3. 发行后股本总额不少于三千万元；
信息披露	1. 分析并完整披露对其持续盈利能力产生重大不利影响的所有因素；
	2. 披露已达到发行监管对公司独立性的基本要求；
	3. 凡是对投资者作出投资决策有重大影响的信息，均应当予以披露。

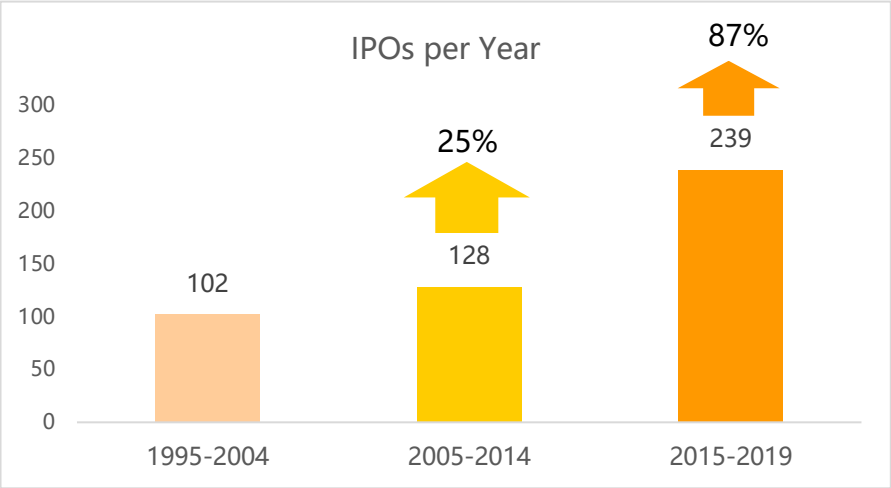
Outlook for China's Securities Markets

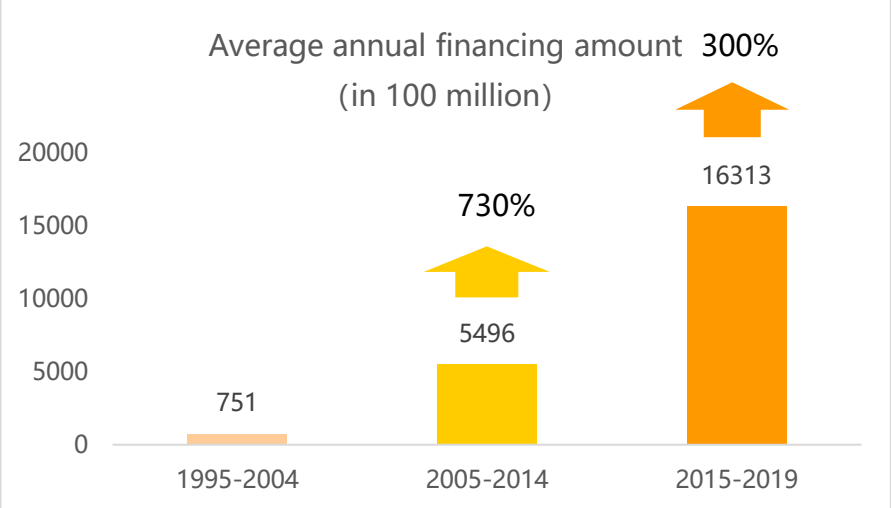
In Its Thirties, China's Securities Market Sets Off Again

Dr Gong Shaolin, Fellow of Cambridge Judge Business School and Member of China Advisory Council

In its thirties, China's securities market greatly increases its ability to serve the real economy. The establishment of two stock exchanges in Shenzhen and Shanghai in 1990 marked the creation of the securities market in new China. China's securities market had experienced its adolescence and welcomed its 30th anniversary in 2020. After 30 years of development and growth, China's securities market, especially the stock market, has significantly increased its ability to serve the real economy. Let's look at the following data.

Evolution of China's Securities Market in the Past 30 Years





Gong Shaolin PhD

Former Chairman

China Merchants Securities

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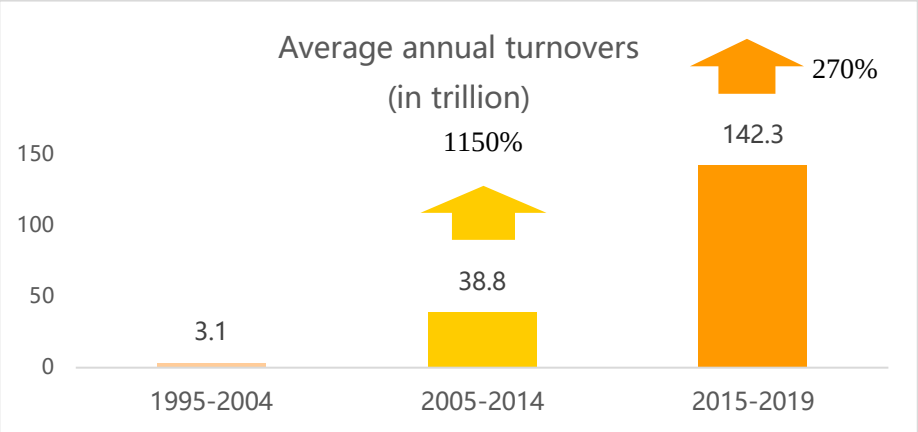
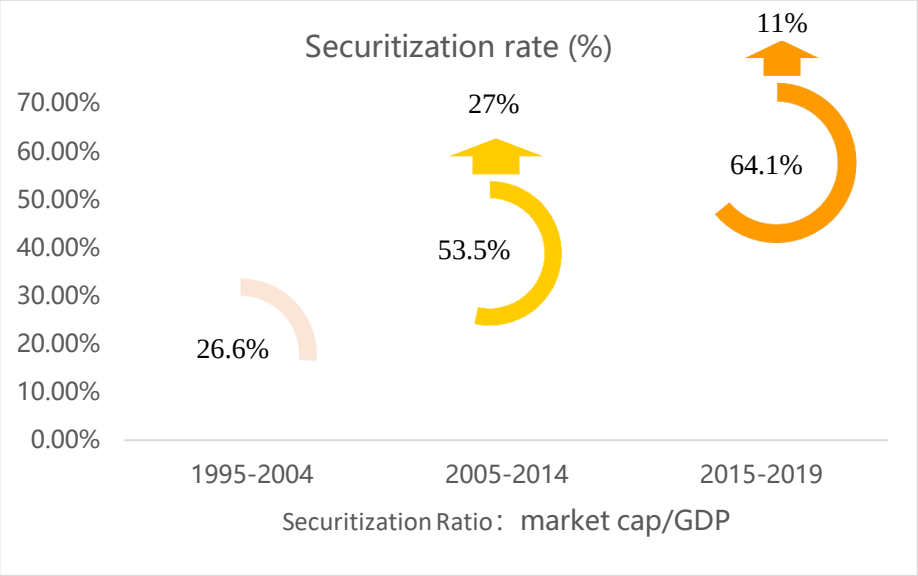
Previously he is the Executive Vice President of China Merchants Bank, the sixth largest mainland bank in China.

He also takes office in The People's Bank of China which is the Central bank of China Government. Dr Gong is also a guest professor of the Graduate School of the People's Bank of China.





In the first few years of the stock market, the size for each indicator was small. We calculated based on the statistical data since 1995. First, the average annual number of IPOs has gradually increased. From 1995 to 2004, the number of IPOs in China's stock market averaged 102 per year; from 2005 to 2014, the number rose to 128, up 25%; from 2015 to 2019, the number rose to 239, up 87%. Second, the average annual funds raised (including IPOs and SEOs) have steadily increased. From 1995 to 2004, the average annual funds raised in China's stock market amounted to 75.1 billion yuan; from 2005 to 2014, the amount ascended to 548.6 billion yuan, an increase of 7.3 times; from 2015 to 2019, the amount ascended to 1631.3 billion yuan, an increase of 3 times. Third, the stock market has gradually expanded, and the turnover in the market rose to a higher level. From 1995 to 2004, the average annual turnover in China's stock market stood at 3.1 trillion yuan; from 2005 to 2014, the amount was up to 38.8 trillion yuan, an increase of 11.5 times; from 2015 to 2019, the amount was up to 142.3 trillion yuan, an increase of 2.7 times. Fourth, the securitization ratio, namely the market cap to GDP, has increased. From 1995 to 2004, the ratio of market cap to GDP of listed companies on China's stock market was 26.6%; from 2005 to 2014, the

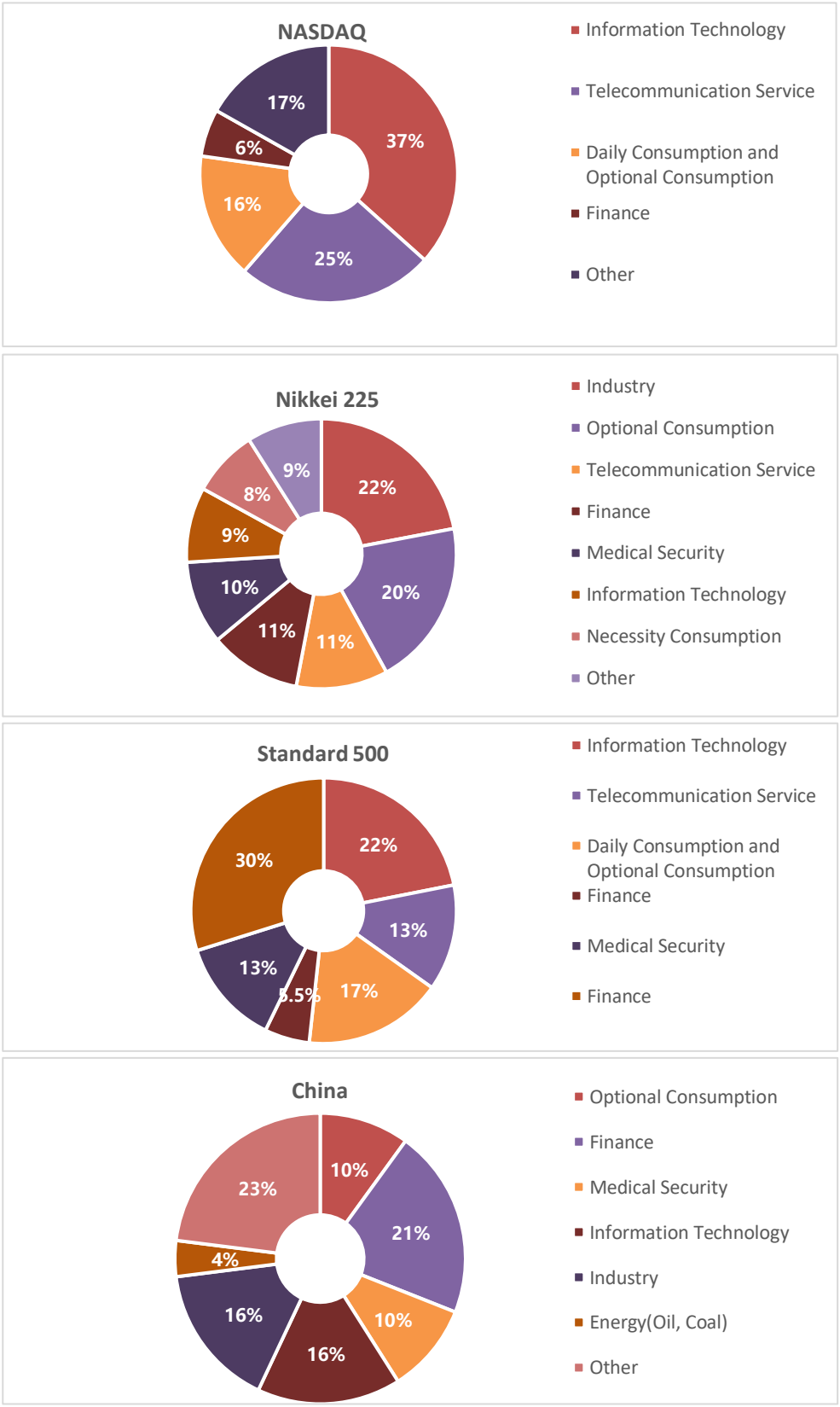
ratio increased to 53.5%, up nearly 27%; from 2015 to 2019, the ratio increased to 64.1%, up nearly 11%. There is an old saying in China, a man should be independent at the age of thirty. It means that only when a man reaches thirty years old can he establish stable values and principles of doing things. In 2020, China's stock market was at the age of 30, and its capability strikingly improved. The next 10 or 20 years will be the best time for grand development. So, where is the way? What's the way for the future? We must know the answers to these questions.

The mission and responsibility of China's stock market. In 2020, China's stock market became the world's second-largest market in terms of market cap, and the amount of newly issued stocks ranked first in the world. The mission of China's securities market is to become the world's most efficient and attractive global market with complete varieties, convenient transactions, and good potential for growth, and to provide the best products for investors at home and abroad. To achieve this goal, the decision-makers and market participants are required to build the market in a balanced manner.

China's stock market also bears the historical mission of promoting the transformation and upgrading of China's economy. It is necessary to vigorously develop direct financing, further increase the securitization ratio, and reduce the leverage ratio in the entire society. China's securitization ratio was 75% in 2020. Compared with mature markets such as in the United States, there is still a lot of room for improvement. This requires more high-quality companies to go listed and increase the earnings per share through mergers and acquisitions, thus enhancing the market cap.

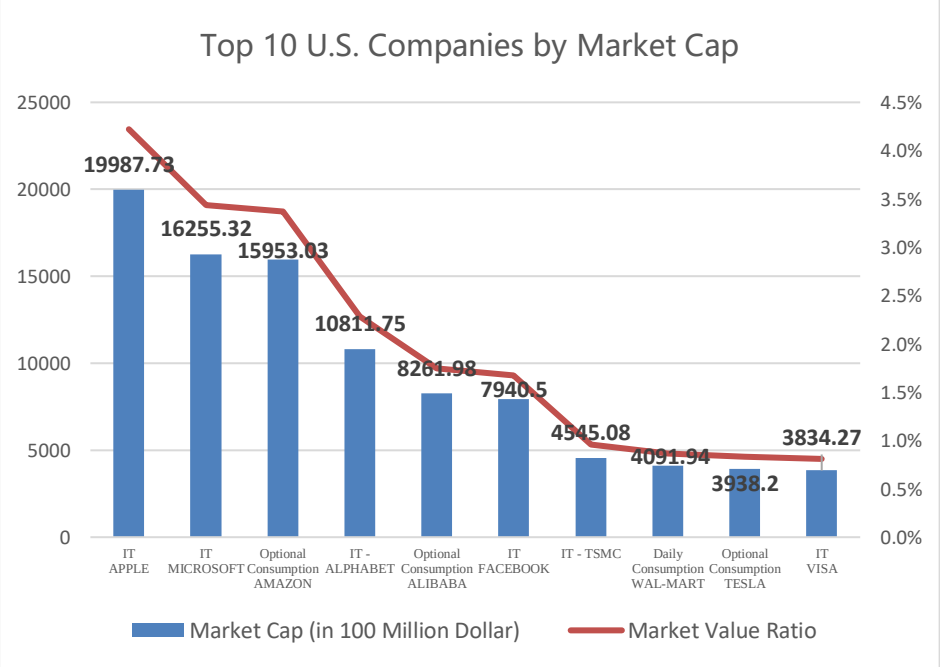
The future development of China's stock market analyzed from the comparison of the industrial structure of Chinese and foreign listed companies.

Comparison of stock market structure in different countries



In terms of the market cap at the end of 2019, high-tech industries occupied a high proportion in the NASDAQ market. IT companies represented the highest market cap, nearly 37%; followed by telecommunications companies, nearly 25%; companies engaged in daily consumption and consumer discretionary accounted for more than 16%; financial companies accounted for 5.5%. Similarly, among the S&P 500 constituent stocks representing large-cap listed companies, IT companies accounted for nearly 22%, the highest proportion in terms of the market cap; companies in daily consumption and consumer discretionary accounted for more than 17%; companies in telecommunications and healthcare accounted for about 13%; financial companies also accounted for nearly 13%. Among the Nikkei 225 constituent stocks, industrial companies held the highest market cap, nearly 21%; consumer discretionary companies ranked second, nearly 20%; telecommunications companies and financial companies tied for third place, both close to 11%; healthcare, IT, and consumer staples companies accounted for nearly 10%, 9%, and 8% respectively. In recent years, although the industrial structure of China's stock market has experienced significant changes following China's economic transformation. For example, the market cap has dropped greatly in the energy sector and financial sector, while rose obviously in the IT sector and consumer goods sector. However, the following trends may continue in the future: first, the market cap of listed financial companies will fall from the current level (nearly 21%); second, the market cap (16%) of the IT and industrial companies is expected to increase; third, with consumption upgrading, the market cap of consumer discretionary companies will increase from the current level (10%); fourth, as China's per capita income enters a high-income stage, the market cap of listed healthcare companies will also rise from the current level (about 10%); fifth, with the development and application of 5G technology, the market cap of the telecommunications industry as an integral part of the new infrastructure shows room for improvement.

In terms of the market cap, the top 10 companies in the US stock market are mainly technology companies, while the top 10 companies in the Chinese stock market are mainly financial and liquor companies. That's because in the past, unprofitable companies are not accepted to issue shares in the Chinese market, leading to the listing of internet-based technology companies in foreign countries. It was a pity for China's stock market.



The registration system is the key to enhancing the ability of China's stock market to serve the real economy. Judging from the experience of developed capital markets, if a country's stock market is to truly become an economic barometer, the listed companies in the market must have a true and comprehensive representation of its economic structure. To a large extent, this is closely related to the issuance and listing system involving the registration system. In the future, if China's stock market makes full use of the capital market's discovery of technologically innovative companies, reasonable pricing, and transaction risks, the registration and listing system should be reformed first. Looking back, the issuance and listing system in

China's stock market went through a ten-year endorsement period from 1990 to 2001, and a twenty-year approval period from 2001 to 2020. On March 1, 2020, the Securities Law of the People's Republic of China took into effect; since then, the securities issuance and registration system has been fully implemented, and continues to draw closer to the rules prevailing in the developed capital markets. Under the previous endorsement system and approval system, the number of listed companies and the amount of money raised each year must be approved in accordance with the plan. The companies that are eligible for IPO must be determined or recommended by relevant departments in provinces, autonomous regions, municipalities directly under the Central Government, and cities specifically designated in the state plan, or relevant state ministries. In addition, the price of shares issued, and the amount of money raised by listed companies are also subject to plans and approvals. As outlined in the report of the Chairman Yi Huiman of the China Securities Regulatory Commission to the Standing Committee of the National People's Congress on October 15, 2020, the registration system includes "one core, two links, and three market-oriented arrangements". The "one core" is information disclosure. Issuers are required to fully disclose information necessary for investors to make value judgments and investment decisions, and to ensure that information disclosed is true, accurate, and complete. The "two links" means that the review and registration are divided into two links: review by the stock exchange and registration at the China Securities Regulatory Commission, interconnected with respective focus. The "three market-oriented arrangements" include creating diversified and inclusive issuance and listing conditions, establishing a market-oriented IPO underwriting system, and building an open, transparent, predictable review and registration mechanism.

Judging from the practice of the registration system on the SSE STAR Market, the reform has achieved remarkable results. In the first three quarters of 2020, 175 companies were listed on the SSE STAR Market, ranking first in the world, far beyond the second-ranked 126 companies on the US NASDAQ Market. On August 24, 2020, the registration system of the Growth Enterprise Market officially started reform, and 18 companies were first listed on the market. From August 24 to October 16, a total of 38 companies were registered and listed on the Growth Enterprise Market, accounting for 46.3% of the total number of listed companies on the same market in 2020 (as of October 16, a total of 82 companies were listed on the Growth Enterprise Market in 2020), an increase of 8.5 times over the same period last year (only 4 companies), and 12 companies more than those listed on the SSE STAR Market during the same period.

It can be predicted that with the exploration and application of the registration system in stock markets such as the Growth Enterprise Market, the registration system will be steadily and firmly implemented under a three-step strategy from the SSE STAR Market to the Growth Enterprise Market and then to the entire market. This will help technologically innovative companies with competitiveness and going-concern ability to go public easily and efficiently.

List of Major IPO Conditions on the Growth Enterprise Market

Qualifications	1. A joint-stock company established by law and operated continuously for more than three years.
	2. The issuer shall specialize in one type of business, and its production and operation activities shall comply with the provisions of laws, administrative regulations, and articles of association, as well as industrial policies and environmental protection policies;
	3. In the past two years, the issuer's main business, directors, and senior managers have not undergone major changes, and the actual controller has not changed.
Standard operation	1. Clear equity. There are no major ownership disputes in the issuer's shares held by the controlling shareholder and the shareholder under the control of the controlling shareholder and actual controller;
	2. The issuer shall establish the shareholder meeting, board of directors, board of supervisors, independent directors, board secretaries, audit committee systems, and shareholder voting systems by law;
	3. Sound internal control system;
	4. The issuer and its controlling shareholder and actual controller have not committed any major violations of the law that harm the legitimate rights and interests of investors and the public interests in the past three years.
Finance and accounting	1. The issuer has been profitable in the last two consecutive years with an accumulated net profit of not less than 10 million yuan; or the issuer has been profitable in the last year, with an operating income of not less than 50 million yuan. The net profit is calculated based on the lower of the amount deducting or not deducting non-recurring gains and losses;
Finance and accounting	2. The last ending amount of net assets is not less than 20 million yuan, and there is no undistributed loss;
	3. After the issuance, the total share capital is not less than 30 million yuan;
Information disclosure	1. All factors that have a significant adverse impact on the issuer's sustained profitability should be analyzed and disclosed;
	2. Basic requirements of issuance supervision for the issuer's independence should be disclosed;
	3. All information that has a significant impact on investors' investment decisions should be disclosed.

全球疫情

抗 COVID-19 国际策略差异和走向分析

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抗疫至今，全球在疫情防控上终于度过了至暗时刻，各国的新增病例与病死率均开始出现回落。但世界各大经济体，大多数出现了 GDP 的负增长，负增长幅度也为百年罕见，已经超过了 2008 年次贷危机带来的影响。这种情况下，如何考虑未来世界的重启，全球各国均面临战略上的考量。以下就全球性抗疫现状、防疫策略差异以及走向做初步的分析。

一、关于病毒溯源的争论

2019 新冠病毒疫情暴发之前，全球没有一次将病毒暴发源头问题上升为政治问题。1918 年流感暴发，全球病死人数超过 5000 万，当时全球人口不到 18 亿。西班牙并非首先出现病例，但是首先报道了病例的发生，都被认为是西班牙流感，后来才知道来自于美洲，但是人类并未将病毒的源头与政治挂钩。上个世界 80 年代，美国暴发获得性免疫缺陷综合征，也就是艾滋病，系感染人类免疫缺陷病毒（也就是 HIV）所致，最终溯源认为与非洲猿免疫缺陷病毒（SIV）进化，最终跨越物种屏障，成为感染人类的病毒，命名为 HIV，但也并未将病毒的源头政治化。2012 年中东呼吸综合征，是迄今致死率最高的冠状病毒感染，虽然起源与骆驼作为中间宿主最终造成人际间传播，但关于病毒的起源问题从来未像今天的新冠病毒那样引人注目。当前，世卫组织完成了在中国的初步溯源工作，不排除在世界其他地方继续溯源。初步的结论是病毒不是人造病毒，没有发现中国实验室与新冠病毒的起源有关。目前所有证据指向病毒来源是自然界，而以起源于蝙蝠的可能性大。只不过病毒如何从蝙蝠携带跳跃进入人类社会的证据尚未找到，目前缺乏直接的证据来证实病毒是如何实现从自然界向人类的跨越的。事实上，人类几乎每次出现病毒从自然界向人类的跨物种传播时，均难以找到直接的跨越物种发生地点与环节，包括 H7N9 禽流感病毒的基因重组，1918 大流感病毒等从禽流感向人流感的跨物种屏障跳跃传播，以及从 SIV 到 HIV 的跨越进化等，均仅仅是从基因组进化数据中获得从动物界向人类跨物种传播的蛛丝马迹，但跨越的地点从未真正明确，其实也对控制疾病的传播不再有价值。包括 2003 年的 SARS 冠状病毒在内，也未能明确病毒是从何时何地进入中间宿主果子狸进行扩增并向人类传播的。2003 年 SARS 暴发后半年，科学家最终才有间接的基因组学证据发现果子狸是传递蝙蝠携带病毒的中间和扩增宿主。其实，就公共卫生防控的策略而已，需要明确病

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毒的储存库，而当前最大的病毒储存库已经是携带病毒并持续不间断传播的感染者。就防控而言，控制病毒的人际传播是防控的重点。疫情防控取得良好效果的国家，如中国与新加坡，均是通过有效切断了病毒在人际间的传播链，阻止了疫情的播散。因此，新冠病毒溯源问题，目前已经被过度政治化，成为了政治向科学界的延续，脱离了科学与防控本身所应有的意义。何时病毒溯源回归到科学本身，才是人类跨越政治偏见，实现合作共赢的开始。

二、新病毒发现、鉴定与建立诊断技术避免了疫情恶化

COVID-19 在人际间的快速播散与病毒进化中持续获得了有利于病毒传播的能力有关。与 2003 年 SARS 及 2012 年的中东呼吸综合征（MERS）相比，COVID-19 的毒力更低，存在大量无症状与轻微症状感染者。这些无或轻微症状感染者成为重要的隐性传染源，可造成大规模的隐匿性传播。尽管如此，COVID-19 目前的全球病死率为 2.2%，仍为季节性流感的 20 倍以上，其严重性远超季节性流感，一旦出现疫情暴发，极易造成重症病房医疗资源的缺乏与挤兑，降低重症患者救治医疗资源的冗余度，进而显著升高了病死率。

中国武汉疫情的防控早期，由于未能识别这是一种新发传染病，迅速蔓延的疫情，开始迅速挤兑当地的重症救治医疗资源，进而造成早期的病死率高达 6%以上。新冠病毒通过广泛传播与超过流感的致病性，击垮医疗资源后导致较高的病死率，病死人数远超流感。相较 2003 年，此次出现 COVID-19 疫情后 1 个月内，由于宏基因组测序技术开始成熟并逐渐在临床应用，因而得以迅速在重症肺炎患者标本中捕捉到与 2003 年 SARS 接近的新型冠状病毒，并经过 10 天左右的进一步深度测序，获得了全基因组数据，中国疾控等研究机构在 1 月 1 日左右获得临床样本，1 月 5 日前获得病毒分离株，1 月 10 日左右向全球公布基因组数据。全球的疫苗研发与诊断试剂开发几乎得以同步展开。这在 17 年前的 SARS 时期几乎不可想象，2003 年长达半年以上才基本明确 SARS 系一种新型的冠状病毒感染所致，当时命名为 SARS-COV，即 SARS 冠状病毒。此次暴发于 2019 年的新型冠状病毒病，命名为 COVID-19，引起 COVID-19（2019-冠状病毒病）的病原体则被命名为 SARS-CoV-2（SARS-冠状病毒-2）。

回想 2003 年，如果当时跨越自然界屏障进入人类社会的是 2019 的新冠病毒，也就是 SARS-CoV-2，而不是 SARS-COV，那么当时人类彻底明确病原体的时间至少在 6 个月以上，可以想象我们会基本失去依靠诊断技术大量发现病人并实施隔离的非药物干预措施的执行，大量无症状患者会造成广泛的传播，病死率将会远远超过今天的 244 万，可能会对人类造成摧毁性的打击，并引起社会经济活动的

彻底瘫痪。2003 年 SRAS 时期虽然没有很好的诊断技术，但是 SARS 不存在明显的无症状感染者，即使缺乏诊断技术，通过对发热病人的隔离也能实现对病毒传播的控制。当前，大多数国家通过对入境人群的隔离与核酸检测，可以实现对输入性病例的有效管控，保证了最低限度的国际间人与货物的流通，世界并未彻底出现停顿。特别是在发热哨点齐备、非药物干预措施实施较好的国家，如中国和新加坡等地，可以有效将疫情控制在极低的水平。目前中国在病毒诊断技术方面可以做到一周内大规模筛查一个上千万人口的城市，通过充分发现病例而有效发挥非药物干预的作用。一个新发的病毒，由于可以有效被识别出来，依靠古老的隔离技术等非药物干预措施，还是能够有效地控制疾病的蔓延的。

三、国际抗疫策略的取向的差异化

全球在疫情防控策略方面出现了显著的差异。国际上并非科技越发达的国家对疫情的控制就越好，而相反地常常发生二律背反的情形。

由于医疗资源相对比较充沛的国家，在新冠早期流行的时候，医疗资源能够承受，整体的病死率较低。在疾病传播的早期，大多数发达国家更倾向于认为该病更接近于重症的流感，或者称之为“大号”的流感。由于年轻人中的病死率非常低，或者说并未高于流感造成的危害，因此难以在全体民众中形成共识并迅速采取积极的非药物干预措施，甚至于关于是否需要戴口罩的争论也延续了数月之久。为了避免对经济造成大的影响，包括专家在内的许多民众认为应该接受大流行的现实，并认为群体免疫是成本最低的最优选项。

中国在疫情早期认识到医疗挤兑可能带来的极端情景，大批脆弱的老年人可能会因此丧生。由此迅速并坚决实施了非药物干预，包括武汉封城、普及诊断技术筛查感染者及提供饱和量的隔离床位（方舱医院），得以迅速控制了疫情。武汉疫情之后，历经北京新发地、大连、新疆、河北以及东北，甚至上海与天津的疫情，无论大小，中国形成了系统性的执行方案，并因此免除了我们对疾病的的恐惧，保证了中国传统节日春节期间全国的基本无病例状态。中国由于早期抗疫比较成功，目前全国范围内基本没有本土传播病例。在上海也曾出现过小范围的局部疫情，但通过迅速响应，精准的流行病学措施，迅速实施了“动态清零”。实现了虽然有散发病例，但是城市生活不受影响的新型抗疫模式，获得了最具成本效益的抗疫效果。

世界范围内，对待疫情的分歧，也反应了东西方在文化上的差异。西方发达国家更依赖于疫苗和药物，历史上每次疫情都是通过疫苗和药物获得抗疫的成功。结核病、艾滋病、病毒性肝炎，每次疫情最终都通过科技的成功让人类度过灾难。东亚国家，具备更强的集体意识与忧患意识，更接受非药物干预措施的实施，无论是中国，还是新加坡，甚至日本与韩国，由于更接受严格的非药物干预措施，疫情总体控制较好。而南亚与南美，疫情的发展更接近自然疫情扩散的模型特征，随着群体免疫的逐渐建立，疫情也逐渐出现了峰值的降低。

当前的全球疫情，无论东西南北，新发病例数均出现了有不同程度的降低趋势。但是如果不进一步采取协同一致的防控策略，按照疫情自然发展趋势，蔓延的时间将会更长，重启世界的时间点也难以确定。哪怕是欧美，由于对疫苗态度的分歧，也难以完成全民的充分疫苗接种。世界一旦开放，由于全球疫苗接种的不均衡，又不能持续实施强有力的非药物干预措施，疫情再度反弹将成为大概率事件。

四、药物与疫苗干预将成为全球性解决疫情的关键选项

对于未充分实施非药物干预的国家，靶向性药物的研发仍然是极为重要的目标。回想 80 年代在美国暴发的艾滋病，当时由于缺乏靶向性药物，艾滋病的病死率几乎是 100%。艾滋病是传播性极高的传染性疾病，如果不是 80 年代末研发成功的靶向性抗病毒药物，1996 年开始全面启动的鸡尾酒疗法，死于艾滋病的人数将远超今天的病死人数。自 1981 年世界首例艾滋病患者在美国发现后，该病已在全球迅速蔓延。据联合国艾滋病规划署和世界卫生组织估计， 全世界累计共有艾滋病病毒感染者滋病病人 6000 万人。其中已有 2200 万死于该病。HIV 是逆转录 RNA 病毒，人类在研发抗艾滋病药物方面积累了大量的经验，这种技术已经成功应用于丙型肝炎与乙型肝炎的治疗。通过靶向性药物的研发，可以大幅度降低疾病的病死率。因此研发抗新冠的靶向性药物，仍然是今天大多数发达国家的第一选项。犹如在抗击艾滋病上的经验，一旦有了靶向性的抗病毒药物，将大幅度降低疾病向重症的进展，并大幅降低病死率。如果治疗性药物可以协同疫苗的普及，那么新冠的病死率将大幅度下降至低于流感病死率的水平。虽然类似于针对艾滋病、病毒性肝炎这样的抗病毒治疗可以让我们摆脱高病死率的威胁。但是世界上从未有过依靠治疗性药物而灭绝一种传染病。在人类抗击艾滋病与病毒性肝炎的近半个世纪以来，药物的作用再强，也不足以根除一种疾病，但是药物研发的成果将极大地补充全球疫苗接种的不充分，让世界有重启的机会。

当前，靶向性药物至今仍未取得重大进展，人类仍然没有掌握类似于针对艾滋病的鸡尾酒疗法。但只要有充足的重症救治床位，则可以通过对人体脏器提供持续的支持，大多数没有基础疾病、65岁以下的个体，均可在医疗体系的支持下，逐渐度过高危期，最终在2-4周内建立起针对病毒的特异性免疫，最终战胜疾病。

疫苗的重要意义在于能提供有效的免疫屏障，病毒的传播速度被阻滞，可以给个体提供保护，免于被感染或者感染后不至于出现重症甚至死亡，当前的临床试验数据提示，无论是何种疫苗，疫苗接种组均几乎没有病例死亡。就群体而言则可以成功阻止疫情的蔓延，从而保证医疗资源的充沛。在医疗资源充分且没有受到挤兑压力的低疫情国家与地区（如新加坡和武汉战役之后的中国），病死率可以降到 0.05%以下。这个病死率甚至已经低于当前病死率为0.1%的流感，足以让我们消除对疾病的恐惧。因此疫苗与靶向抗病毒药物对于降低病死率，重启世界具有重要的意义。

五、疫苗研发的成果与作用超出了预期

新冠疫苗的研发创造了历史上研发新冠疫苗的记录，在1年时间内，已经走完了疫苗从研发到上市的全过程。假设疫苗的保护是永久的，若有效率为 100％，建立群体免疫所需的接种率在 60％~72％；如果疫苗有效率低于 80％，则所有人都需要接种疫苗才能建立群体免疫。当优先接种 60 岁以上成年人时，患者病死率可以降至最低。新冠病毒已经成为在人世间的常驻病毒，除了疫苗，世界没有第二种打开的方式，除非愿意付出大量死亡的代价。

截止到2021年2月16日，以色列疫苗的接种率达到了78剂/100人，应能建立免疫屏障。在以色列如果能够观察到新发感染率与病死率的迅速降低，彻底免除医疗挤兑风险，则以色列将成为全球率先开放的国家，这将对全球的开放提供了榜样，将会极大促进全球范围内疫苗接种计划的实施。

当今全球疫苗接种方面，到 2021 年 2 月中旬，全球疫苗接种的比例是美国 16.5 剂/100 人，英国 23.7 剂/100 人。结合美国的自然感染率为8.5%，英国的自然感染率为6%。对于病毒的保护率已经达到了 25-30%。再加上欧美目前仍执行口罩令与社交距离的限制，则足以将传播系数降低至 1.0 以下。因此，只要疫苗接种保持当前的速度推进，美国和英国均会在9月份初步完成疫苗的接种。此时疫苗的接种将会到达平台期，则有望在自然感染的基础上达到群体免疫的水平。在今年的第四季度，疫苗接种较好且已经有较高自然感染率的

国家则可具备重启的基本条件（下图红色为自然感染率，蓝色为疫苗接种获得免疫率，达到群体免疫初步划定为 70%的免疫率）。

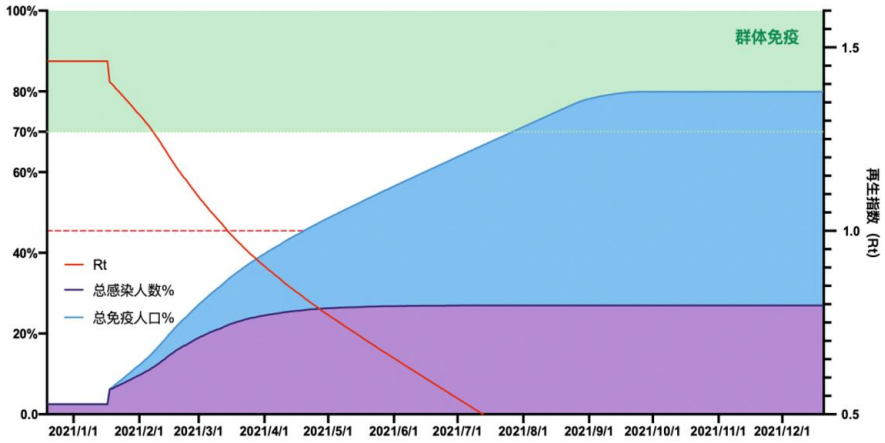

图 疫苗接种与自然感染对群体免疫率的影响

六、病毒变异持续发生，但其危害应能被克服

冠状病毒广泛的宿主分布特性以及自身基因组的结构特征使其在进化过程中极易发生基因重组,呈现遗传多样性。根据进化的基本原理，病毒感染人群后可能会发生变异，自然选择偏好高且传染力强的突变毒株将更加利于在人群中传播。D614G 突变在欧洲最早发现后不断扩散传播，目前带有这个突变的病毒株已经成为了传播的主要基因型。2020 年 9 月 B1.1.7 系变异株从英国开始出现，传播率增加了 50~70%，但疫苗与免疫后血清大部分仍有保护力。除 B.1.1.7 系，N501Y 突变位点主要出现在南非。变异还会继续，但无论中国和国际，疫苗生产线目前来看足以应对这些突变。目前国际上的 mRNA 疫苗和中国的灭活疫苗对变异病毒的中和作用做了研究，仍有保护作用。今后还可以根据病毒的变异进行疫苗的改进，克服病毒变异带来的不确定性。

七、疫苗推广的公平性与全球化

在全球疫苗供应能力上，2021 年只能在具备疫苗生产能力的美国、欧洲以及中国和俄罗斯等少数国家，可以实现疫苗的全部覆盖。世界能否开放取决于全球疫苗的可及性是否遵循了公平的原则。两周前，我受邀参加了世卫组织专家组的会议，也参加了亚太区专家的讨论会，当前亚洲和非洲国家的疫苗接种远远低于欧洲和美国。疫苗的供应已经显示出全球的不平衡性。由于目前全球性的疫苗分配并未达成共识，世卫组织对此忧心忡忡。未来我们还很难预估何时在疫苗的供应上可以达成全球共识。历史上全球性的疫情防控都需要超越政治的全球协作。人类在 1979 年依靠全球性的协作，完成了天花疫苗的接种，人类最终实现了天花的消除，这是世界卫生组织成立以来的高光

时刻，人类历经二战，冷战尚未结束，但是人类取得了针对病毒这个共同敌人的伟大战役胜利。如今历史翻过了 40 多年，人类经历了两次世界大战，也跨越了冷战，甚至于正处于如火如荼的全球化过程中。但是近年来出现的逆全球化浪潮已经充分影响到这次抗疫的全球大协作。无论是病毒溯源还是疫苗的供应，都未能将人类的终极利益置于首位。疫苗接种的公平性将会极大反映出当前的国际生态环境与全球化的困境。中国不能孤独地赢得这场抗疫的胜利，如果全球未能有效控制疫情，中国将持续地受到输入性疫情的挑战。欧美的疫苗接种也未必能够顺利实施接近全人群的覆盖，接种疫苗后的保护力持续时间以及病毒变异的影响目前尚不确定。大概率新冠疫苗不能提供持久性的保护（可能会在 1-3 年之间）。因此，在缺乏全球同步接种的前提下，即使欧美完成了初步的疫苗接种，也仍然会受到疫情反复和病毒变异的挑战，人类可能会长时间生活在新冠的阴影之中，世界的开放终究会遭遇极大的困难。一个不能彻底开放的世界，和不确定的疫苗保护期限，将会极大地延缓世界的重启和经济的全面发展。

八、疫苗时代的常态化抗疫

因为疫苗接种不能一蹴而就，疫苗提供的保护也并非一劳永逸。如果希望最大程度地恢复常态化的经济生活，促进全球化经济的发展，参照历史上天花的彻底控制与流感的全球防控，必须实施疫苗接种联合公共卫生措施的同步推行。当前，疫苗接种还有待时日，世界上大多数国家仍需采取严格的疫情控制措施，包括保持社交距离与社会经济活动的控制。但严格的公共卫生措施往往难以持久。在这种情况下，如何最大程度保证常态化生活的抗疫策略是全局性的防疫挑战。随着疫苗接种的推进，世界各国可以通过学习彼此的防控经验，一方面迅速推动通过全民疫苗接种的覆盖，另一方面强化公共卫生体系建设，做到早期预警、快速响应、精准防控、动态清零。如果能够充分发挥公卫说体系的作用，则能最大程度地通过精准防控，同时将疫情控制在极低的动态清零水平，最大程度地恢复正常化的生活，进入常态化抗疫的阶段，将持续抗疫的社会成本降至最低。

COVID-19, 是人类全球化取得巨大成就时发生的一场全球性公共卫生事件。这场疫情的暴发，加剧了逆全球化潮流的盛行。但是大流感在 100 年前的上个世纪已经发生，甚至于在 13 世纪也已经有鼠疫的全球大流行。全球化并非造成瘟疫蔓延的原因，而不能控制瘟疫的原因恰恰是人类的分裂。也许全球化的问题也只能通过人类的团结才能予以解决。人类从迈出伊甸园之时，就注定不能再回头了。

A Global Pandemic

Analysis on the Difference and Trend of Anti-COVID-19 International Strategies

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Up to now, the global pandemic prevention and control has finally passed its darkest hour, and the number of new cases and deaths around the world has begun to drop. However, most of the world's major economies have seen negative GDP growth, a rate rarely seen in the past century, which has a wider impact than the 2008 subprime crisis. In this case, countries around the world are faced with strategic considerations about how to consider the future restart of the world. The following is a preliminary analysis of the current situation of global pandemic prevention, the differences of pandemic prevention strategies and their trends.

1. Controversy over the origin of the virus

Before the COVID-19 outbreak, there was not a single case in which the source of a virus was regarded as a political issue. The outbreak of influenza in 1918 killed more than 50 million people worldwide, when the global population was less than 1.8 billion. Spain first reported a case of what was believed to be the Spanish influenza, which was later known to have originated in the Americas. But human society did not link the origin of the virus to politics. In the 1980s, there was an outbreak of acquired immunodeficiency syndrome, or AIDS, in the United States, which was caused by the human immunodeficiency virus (HIV). It was thought to have evolved from the simian immunodeficiency virus (SIV), which eventually crossed the species barrier and infected humans, known as HIV. However, the virus was not politicized. Middle East Respiratory Syndrome (MERS) in 2012 was the deadliest coronavirus to date. It originated in camels (as intermediate host) and eventually spread from person to person. However, the origin of the virus has never been as controversial as the novel coronavirus is today. Currently, WHO has completed the preliminary work of tracing the origin in China. It does not rule out the possibility of further tracing in other parts of the world. The preliminary conclusion is that the virus is not man-made and no Chinese laboratory has been found to be associated with the origin of COVID-19. All evidence so far points to natural origin of the virus, with bats as the most likely source. However, no evidence has been found of how the virus leaped from bats into human society, and there is no direct evidence of how it made the leap from nature to man. In fact, almost every time where there is a cross-species transmission from nature to humans, it is difficult to find the accurate location and processes.

The genetic recombination of H7N9 virus, the cross-species transmission of the 1918 flu pandemic from animals to humans, and the cross-species evolution from SIV to HIV were obtained from genome database. However, it's not clear where they are transmitted, which is no longer valuable for controlling the spread of the disease. It is not clear when and where the 2003 SARS was amplified in masked civets, the intermediate hosts, and spread to humans. Half a year after the 2003 SARS outbreak, scientists finally had indirect genomic evidence that civets were the intermediate and amplifying hosts for the bat - borne virus. In fact, a public health strategy requires a clear repository of the virus, and the largest repository of the virus is already infected people who carry the virus and continue to spread it. Control of human-to-human transmission of the virus is the focus of prevention and control. Countries (such as China and Singapore) that have achieved good results in the pandemic prevention and control have prevented the spread of the virus by effectively breaking the chain of transmission between people. Therefore, the COVID-19 origin has been overly politicized, and has become a continuation of politics to the scientific community, departing from the due significance of science and prevention itself. The moment when the virus-tracing investigation depends on science itself is the beginning of win-win cooperation for mankind beyond political prejudice.

2. The discovery, identification, and development of diagnostic techniques for the new virus prevented the pandemic from worsening.

The rapid spread of COVID-19 from person to person was because it had evolved to be more infectious. COVID-19 is less virulent than SARS in 2003 and the Middle East Respiratory Syndrome (MERS) in 2012, with a large number of infected people with no or mild symptoms. These people become an important source of latent infection and can cause large-scale latent transmission. Nevertheless, the global fatality rate of COVID-19 is 2.2%, more than 20 times that of seasonal influenza. In case of an outbreak, it is easy to cause the lack of intensive care units. Adequate medical resources for the treatment of critical patients can't be guaranteed, thus increasing the case fatality rate.

In the early stage of the epidemic in Wuhan, China, due to the failure to identify it as a new infectious disease, the rapid spread of the epidemic caused a serious shortage of local medical resources for the treatment of severe patients, resulting in a case fatality rate of more than 6%. COVID-19 is more contagious than flu, and the number of deaths is far higher than that of flu. Since the metagenomics sequencing has been used in clinical practice, within 1 month after the COVID-19 outbreak, the novel coronavirus similar to SARS in 2003 was quickly captured in the samples of patients with severe pneumonia. After 10 days of deep sequencing, the whole genome data were obtained.

The development of vaccines and diagnostic reagents around the world began almost at the same time. This was almost unimaginable 17 years ago during the SARS period. In 2003, it took more than half a year to be basically clear that SARS was caused by a new coronavirus infection, which was then named SARS-COV, or SARS coronavirus. The novel coronavirus, which occurred in 2019, was called COVID-19, and the pathogen that caused COVD-19 was called SARS-CoV-2.

Back in 2003, if the 2019 novel coronavirus (SARS-CoV-2), instead of SARS-COV, had crossed the natural barrier into human society, it would have taken at least six months to identify the pathogen. It is conceivable that we would be unable to rely on diagnostic techniques to identify and isolate patients in large numbers and implement non-drug interventions. A large number of asymptomatic patients would cause relatively high infection rate, and the number of deaths would far exceed today's 2.44 million. It could be a devastating blow to humanity and lead to complete paralysis of social and economic activity. Although there was no good diagnostic technique for SARS in 2003, there were no obvious asymptomatic infectors. Even in the absence of diagnostic techniques, the spread of the virus can be controlled by isolating febrile patients. At present, most countries can effectively control imported cases through quarantine and nucleic acid testing of people entering the countries, which ensures the minimum international flow of people and goods. The world has not come to a complete standstill. In particular, countries (such as China and Singapore) with well-equipped fever alertness clinics and well implemented non-drug interventions can effectively control the transmission of the disease to very low levels. At present, China can conduct large-scale screening of a city with a population of over 10 million within one week, and effectively implement non-drug intervention by active case detection. If a new virus can be effectively identified, the spread of the disease can be effectively controlled by non-drug interventions such as quarantine.

3. Differences in the international anti-pandemic strategies

Countries differ significantly in their prevention and control strategies. It is not that the more technologically advanced the country is the better at controlling the pandemic. Sometimes, the reverse may be the case.

Some countries have relatively abundant medical resources, and the overall case fatality rate was low in the early pandemic period. In the early stage of the disease, most developed countries tended to think of it is as akin to severe flu, or "pandemic" flu. Since the fatality rate among young people was very low, or not higher than that caused by influenza, people didn't take it seriously and active non-drug interventions weren't taken quickly. Even the debate over whether to wear a mask went on for months. In order to avoid a major impact on the economy, many people, including experts, believed that the pandemic

should be accepted, and that herd immunization is the most cost-effective option.

China recognized early in the pandemic the extreme scenario of inadequate medical resources, which could lead to the deaths of large numbers of vulnerable elderly people. As a result, non-drug interventions were rapidly and resolutely implemented. For example, Wuhan was placed under lockdown, diagnostic techniques were popularized to help detect COVID-19 infection, and adequate beds (shelter hospitals) were provided. Through these measures, the pandemic was quickly brought under control. The Wuhan outbreak was followed by outbreaks in Beijing, Dalian, Xinjiang, Hebei and north-eastern China, as well as in Shanghai and Tianjin. China has developed a systematic implementation plan for the pandemic. Therefore, we no longer panic when it comes to this disease. And there were almost no cases reported in the country during the Spring Festival. Due to the success of the early anti-pandemic campaign in China, there were almost no local cases reported across the country. There had been small-scale epidemic rebound in Shanghai, but through rapid response and precise epidemiologic measures, the spread of the virus was quickly controlled without affecting all social activities. Although sporadic cases have occurred, urban life has not been affected, which has achieved the most cost-effective effect.

The divergent responses to the pandemic around the world also reflect cultural differences between East and West. Western developed countries rely more on vaccines and drugs. Historically, vaccines and drugs have been successful in fighting epidemics and pandemics. Every time there is an epidemic/pandemic such as tuberculosis, AIDS, viral hepatitis, technology is the ultimate way to get humanity through the disaster. East Asian countries, with a stronger sense of collective and crisis awareness, are more receptive to the implementation of non-drug interventions. China, Singapore, Japan and South Korea have achieved better control of the pandemic due to greater acceptance of non-drug interventions. In South Asia and South America, the evolution of the pandemic was more similar to the model characteristics of natural pandemic spread. With the gradual establishment of herd immunity, the pandemic continues its gradual decline from its peak.

At present, the number of new cases in the world has shown a decreasing trend of different degrees. However, without well-coordinated prevention and control, the natural course of the pandemic will be longer, and it will be difficult to determine when to restart the world. Even in Europe and the United States, due to differences in attitudes towards vaccines, it is difficult to achieve mass vaccination. Given the global inequity in COVID-19 vaccination and the lack of sustained and strong non-drug interventions, it is highly likely that the outbreak will rebound once the world opens up.

4. Drug and vaccine interventions will be a key global option to address the pandemic

The development of targeted drugs remains an extremely important objective in countries where non-drug interventions have not been adequately implemented. There was an outbreak of AIDS in the United States in the 1980s, and it was almost deadly due to the lack of targeted drugs. AIDS is a highly contagious disease. Without the targeted antiviral drugs developed in the late 1980s and the highly active antiretroviral therapy (HAART) introduced in 1996, the number of deaths from AIDS would have been far greater than the number of deaths from COVID-19 today. Since the world's first case of AIDS was discovered in the United States in 1981, the disease has spread rapidly around the world. Joint UN Program on HIV/AIDS (UNAIDS) and the World Health Organization (WHO) estimate that there are 60 million people worldwide living with HIV or AIDS, 22 million of whom have died from the disease. HIV is a retrovirus or RNA virus. A great deal of experience has been accumulated in the development of anti-AIDS drugs, which have been successfully applied to the treatment of hepatitis C and hepatitis B. The fatality rate of a disease can be greatly reduced through the development of targeted drugs. So developing targeted drugs against COVID-19 is still the first option for most developed countries today. As in the fight against AIDS, once targeted antiviral drugs are available, the progression of the disease to severe disease will be greatly reduced, so will the fatality rate. If therapeutic drugs can be used in conjunction with the vaccines, the fatality rate of COVID-19 could drop sharply below that of influenza. Although antiviral drugs against HIV/AIDS and viral hepatitis could get us out of the high fatality rate, there has never been a time in history when an infectious disease has been wiped out by therapeutic drugs. In nearly half a century of fighting AIDS and viral hepatitis, no drug is powerful enough to eradicate a disease. But the results of drug development will greatly supplement the inadequate global vaccination, giving the world a chance to restart.

At present, there has been no significant progress in the development of targeted drugs, and we still do not have a cocktail therapy similar to that used for AIDS. But as long as sufficient intensive care beds are available, continuous support for human organs can be provided. Most individuals under the age of 65 who have no underlying disease can, with the support of the health care system, gradually pass through the high-risk period, and within 2-4 weeks, they can build up specific immunity against the virus, and finally overcome the disease.

Vaccines are important because they provide an effective immune barrier to slow the spread of the virus and protect individuals from becoming infected or from severe illness or death after infection. Data from current clinical trials suggest that, regardless of the vaccine, there were almost no deaths in the vaccinated group. Vaccines can prevent the spread of the pandemic, thus ensuring the abundance of medical resources. In low-prevalence countries and

regions (such as Singapore and China after the outbreak of Wuhan) with adequate medical resources, the fatality rate can be reduced to below 0.05%. That's even lower than the current fatality rate of flu, which is 0.1%, which is enough to put the fear of disease at rest. Therefore, vaccines and targeted antiviral drugs are of great significance in reducing the fatality rate and restarting the world.

5. The results and effects of vaccine development have exceeded expectations

The development of COVID-19 vaccine has set a record in the history of the development of vaccine. In one year, the entire process of vaccine development and marketing has been completed. Assuming that the vaccine is permanently effective, the vaccination rate required to establish herd immunity is between 60% and 72%; if the vaccine is less than 80% effective, everyone needs to be vaccinated to establish herd immunity. The case fatality rate can be reduced to a minimum when priority is given to adults over 60 years of age. The COVID-19 has become a permanent presence in the world, and there is no second cure other than vaccines, otherwise we will pay the price of a large number of deaths.

As of February 16, 2021, Israel had a vaccination rate of 78 doses per 100 people, which will enable the establishment of an immunity barrier. Israel will be the first country in the world to open up if a rapid reduction in the number of new infections and deaths is observed and adequate medical resources can be ensured. This will set an example of global openness and will greatly facilitate the implementation of vaccination programs on a global scale.

By mid-February 2021, the global vaccination rate is 16.5 doses per 100 persons in the United States and 23.7 doses per 100 persons in the United Kingdom. Combined with a natural infection rate of 8.5% in the United States and 6% in the United Kingdom, the protection rate against the virus has reached 25-30%. In addition, masks and social distancing are still required in Europe and the United States, which would be enough to reduce the transmission coefficient to below 1.0. As a result, as long as vaccination continues at its current pace, both the United States and the United Kingdom will initially complete vaccination in September. At this time, the vaccination will hit a plateau, and it is expected to achieve herd immunity on the basis of natural infection. In the fourth quarter of this year, countries that are well vaccinated and already have high natural infection rate will have the basic conditions to restart (red for natural infection rate and blue for vaccination coverage, reaching the immunization rate of 70% initially assigned to herd immunization).

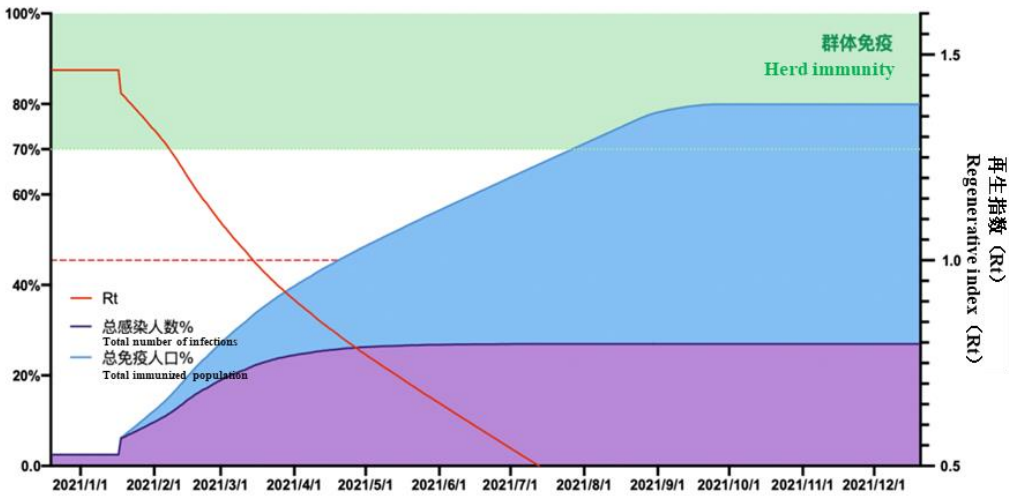

Fig. Effect of Vaccination and Natural Infection on Herd Immunity

6. Viral mutations continue to occur, but its harm should be overcome

Due to its wide distribution in the host and the structural characteristics of its own genome, coronaviruses are prone to genetic recombination and show genetic diversity during their evolution. According to the basic principles of evolution, a virus can mutate when it infects a human. Highly infectious mutant strains with high natural selection preference spread more easily from person to person. The D614G mutation was first discovered in Europe and then spread continuously. And the virus strains with the mutation have become the dominant variant in the global COVID-19 pandemic. The B1.1.7 mutant strain first appeared in the UK in September 2020, resulting in an increase in transmission rate of 50-70%. However, most of the vaccines and serum after immunization remain protective. Except for B.1.1.7 mutant strains, N501Y mutation mainly appeared in South Africa. Mutations will continue, but vaccine production lines around the world are now adequate to deal with these mutations. At present, we have studied the neutralization effect of the international mRNA vaccine and the Chinese inactivated vaccine on the mutated virus, and found that the vaccines are still protective. In the future, the vaccines can be improved according to the variation of the virus, so as to overcome the uncertainty caused by the virus variation.

7. Equality and globalization of vaccination promotion

In terms of global vaccine supply capacity, full coverage will be available in 2021 only in a few countries with production capacity, such as the United States, Europe, China and Russia. Whether the world opens up depends on whether global access to vaccines follows the principle of fairness. Two weeks ago, I was invited to attend a meeting of the WHO Expert Advisory Panel, as well as Expert Seminar for Asia Pacific. I learned that current vaccination rates in Asian and African countries are far lower than those in Europe and the United States. The vaccine supply has shown a global inequality. The World Health Organization is concerned that there is no global consensus on the distribution of vaccines. It is difficult to predict when a global consensus will be reached on the vaccine supply. Historically, global pandemic prevention and control required global collaboration. The eradication of smallpox in 1979, a global effort to vaccinate against it, was a highlight in the history of the World Health Organization.

Despite the World War II and the Cold War, mankind had won the great battle against this common enemy, the virus. More than 40 years later, mankind has gone through two world wars and the Cold War. Now globalization is in full swing. But the tide of anti-globalization that has emerged in recent years has affected the global efforts to fight the pandemic. Neither the origin of the virus nor the supply of vaccines puts the ultimate human interest in the first place. The vaccination inequality will greatly reflect the current international ecological environment and the dilemma of globalization. China cannot win this battle alone. If the world fails to control the pandemic effectively, China will continue to be challenged by imported cases. Europe and the United States may not be able to achieve the full coverage of vaccination. The duration of protection after vaccination and the impact of virus mutation are still uncertain. COVID-19 vaccine is unlikely to provide lasting protection (probably between 1-3 years). Therefore, in the absence of global synchronized vaccination, even if the European and American countries have completed the initial vaccination, they will still be challenged by the recurrence of the pandemic and the mutation of the virus. Humans may live in the shadow of Covid-19 for a long time, and the opening of the world will eventually encounter great difficulties. A world that cannot be fully opened up and an indefinite period of vaccine protection would greatly delay the world's revival and overall economic development.

8. Normalized anti-pandemic in the era of vaccines

Vaccination does not happen overnight, nor does the protection it provides. If we hope to restore normal economic life to the maximum extent possible and promote the global economic development, the combination of public health measures must be carried out, by reference to the thorough control of smallpox and the global prevention and control of influenza in history. At present, vaccination is still a long way off, and most countries in the world still need to take strict pandemic control measures, including keeping social distance and social and economic activities under control. But strict public health measures are often unsustainable. In this case, how to ensure normal life is a global challenge in fighting the pandemic. With the progress of vaccination, countries around the world can learn from each other's experience in prevention and control. They can quickly promote the coverage of universal vaccination and, strengthen the construction of public health system, so as to achieve early warning, rapid response, precise prevention and control and elimination of cases without affecting social activities. If the role of the public health system can be brought into full play, the transmission of the virus can be controlled at a very low level through precise prevention and control so as to restore the normal life to the greatest extent, and the social cost of the continuous fight against the epidemic can be minimized.

COVID-19 is a global public health event that occurred at a time of great progress in globalization. The outbreak of the pandemic intensified the prevalence of counter-globalization. Influenza occurred in the last century, and there was a global plague pandemic in the 13th century. Globalization is not the cause of the pandemic, while the failure to control it is precisely because of the division of mankind. Perhaps the problem of globalization can only be solved through human solidarity. From the moment men stepped out of the Garden of Eden, they were doomed never to return.

Climate Change

COP26: A new 'Green Era' for UK-China Relations?

Lord Karan Bilimoria CBE DL, President of the Confederation of British Industry

The recent confirmation of President-Elect Jo Biden as the 46th President of the United States has given the world cause for rare celebration in a pandemic-ravaged year. Under President Trump the world's response to the 'other' global crisis, climate change, was at risk of being derailed. Much like with the Coronavirus, the only way to tackle global challenges at pace is with a global, unified approach.

The pandemic has shown the importance of partnership and collaboration and, as we look forward to 2021, there is hope for a new lease of life for multilateralism. Whether this hope is rhetoric or reality will be born out at COP26 in the UK with the prospect of the world's two largest carbon emitters, the US and China, who collectively account for 40% of total global emissions, finding areas of genuine common ground in tackling climate change.

The UK has led the way on ambitious commitments ahead of COP26 with net zero 2050 and targeting 68% emissions cuts by 2030. President Xi Jinping's unexpected yet welcome pledges at the UN Assembly in September 2020 that China would achieve carbon neutrality by 2060 and that the country's CO2 emissions would peak by 2030 have followed suit and certainly put the spotlight on the US to re-engage with the international community on climate change.

The initial signs look good with the US already determined to re-join the Paris Agreement and the Biden administration putting net zero at the heart of a US$2trillion programme to 'build back better'.

Within this ambitious agenda the US plans to revive its Clean Air Act, regulate power plants, improve auto efficiency standards, and push for a more climate friendly Infrastructure Bill.

Yet with bilateral relations between the US and China at a 50-year low, and likely Republican opposition in the US Senate a challenge to enacting meaningful change, the path to net zero will be fraught with political difficulty.

Time is not on their side either with the World Meteorological Organisation (WMO) declaring that the year 2020 will be one of the three hottest since records began in 1850.

Lord Karan Bilimoria CBE DL

President

Confederation of British Industry

Bilimoria is well known for founding the popular global beer brand, Cobra Beer and currently operates as the company's chairman.

In addition to his business activity, Bilimoria is a politically active crossbench member of the House of Lords, currently serves as Chancellor of the University of Birmingham and is the President of the Confederation of British Industry.

Furthermore, the relentless heating of the planet has led to recent record temperatures in Siberia, more than 5°c higher than average, and 80% of the world's oceans and coral reefs experiencing at least one marine heatwave or bleaching event annually.

However, with more than 127 countries now committed to carbon neutrality by 2050 and varying commitments from China, the US, Japan, Korea, and the European Union, prospects for hitting the ambitious Paris Agreement goal of no more than a 2°C rise in temperatures this century are looking more achievable today than ever.

Indeed, China's 2060 carbon neutral pledge would, according to Climate Action Tracker, reduce end of century warming estimates by 0.2°C to 0.3°C alone.

There is however no room for complacency.

Antonio Guterres, Secretary General of the UN, recently declared that he wishes to build a global coalition focused on achieving net zero emissions by 2050 with 'every country, city, financial institution and company' adopting this plan to counter humanity' s 'suicidal' war on planet earth.

And to exemplify this folly a vast area of Amazon rainforest totalling more than 11,000 sq. km or seven times that of Greater London, was razed between August 2019 and July 2020..

Preventing further irreplaceable loss of nature will be one of many critical global biodiversity issues discussed at the postponed COP15 UN Convention on Biological Diversity now scheduled for 17-30 May in Kunming, China.

The COP26 United Nations Climate Change Conference, scheduled to meet in Glasgow in November 2021, will be a major milestone in UK political history. Following its departure from the EU, the conference will be an opportunity to showcase how the UK can build consensus and to lead in the face of global challenges.

To be successful, both the US and China need to be bought to the table and commitments made which transcend their geopolitical and trade issues. The UK continues to maintain a strong bilateral relationship with the PRC, not least through a series of government-to-government dialogues and, perhaps more importantly, through regular working level engagement spanning a range of areas including business, academia, and R&D.

Preparations for the COP26 have already begun in 2020 with COP26 President Alok Sharma having regular contact with his counterpart Huang Runqiu, China's Minister of Ecology and Environment.

Sir Laurie Bristow KCMG, the UK's COP26 Regional Ambassador has also maintained relations with HE Ambassador Liu Xiaoming, China's Ambassador to the UK.

The UK's new British Ambassador to China, Caroline Wilson CMG, has already put low carbon partnerships and the 'race to zero' emissions initiative at the heart of British diplomatic engagement on the Mainland.

In her first regional trip to Guangdong province in November for example she visited the Shenzhen Bus Group to see COP26 branded electric Double Decker buses designed and built by BYD. Both companies have pledged to support the UK's flagship 'race to zero' campaign.

Chinese SOE (State Owned Enterprise) CNPC (China National Petroleum Corporation) has also made welcome commitments to being a 'near zero' business by 2050, certainly a first for a state-owned PRC corporation.

UK-China partnerships seeking to develop their 'race to zero' business also include BP which established a joint venture with DIDI in February, setting up a network of 340 EV charging points across 19 stations in Guangdong.

The 'race to zero' business pledge will be underpinned by five linked UK-China COP15 and COP26 campaigns through 2021 focusing on climate resilience, energy, finance, nature, and transportation.

Given the range of planned initiatives it will be essential that business, government, and the consumer work closely together to make a success of COP26 in November.

Indeed, the CBI's ground-breaking 2008 Report 'Climate Change - Everyone's Business' highlighted the importance of these different groupings working together to tackle climate change more than 11 years ago.

Our decarbonisation journey has accelerated since then, and the discussion today is how we deliver the next phase of our transition to a low-carbon economy, building on the 41% reduction in emissions already achieved since 1990.

The CBI's most recent climate change report, our Green Recovery Roadmap published September 2020, highlighted some of the urgent policy decisions

needed both to deliver green jobs and make progress to our 2050 net-zero emissions target. Priorities included progressing the policy frameworks for hydrogen and carbon capture technologies, delivering new nuclear construction, and the infrastructure and incentives needed to switch to electric vehicles.

I chair the joint CBI and University of Birmingham Heat Policy Commission, which reported in summer 2020 on the ways the UK can overcome one of its largest net-zero challenges, decarbonising heat. This developed the theme of business and government working together in particular to deliver practical solutions.

But the UK must not do this in isolation, and the speed and scale of the low-carbon transition means there are now new and emerging opportunities for UK business to collaborate with Chinese partners in green finance, green hydrogen research, civil nuclear and long-distance power transmission.

Perhaps the most exciting areas of UK-China partnership lie in academic research with the UK leveraging its world leading R&D capabilities and expertise in offshore wind and tidal excellence.

Indeed, a UK-China tech lab for offshore wind has just been established in Guangdong province.

The China-UK Low Carbon College (LCC) won the 'Innovation in Education' award at the 2019 China-Scotland Business Awards thanks to its academic partnerships with the University of Edinburgh and Shanghai's Jiaotong University.

Teams from both countries collaborated on research projects including sustainable construction, air quality, energy efficiency and smart cities.

More than 100 Edinburgh University based academics from business, geosciences, engineering, informatics, Law and Chemistry departments provided 'green pathways' for ideas, talent and technology to be established and scaled up to tackle the climate change challenge.

These and many other unsung yet incredibly important academic research partnerships have formed the bedrock of this year's international ground-breaking vaccine research culminating in the announcements of at least three Covid vaccines in the past weeks.

UK academia will continue to lead efforts to find new low-carbon solutions to the needs of our economies. For example, a partnership between the private sector and the University of Birmingham led to the testing of the first hydrogen-powered train on a UK mainline this year. Maintaining and deepening these ties will remain vitally important not just for individuals and institutions but for humanity itself.

As I approach the end of an extraordinary first six months as President of the CBI, I am extremely proud of our work as the UK's voice of business and only too aware of the huge challenges facing our members, society, and international governments as we approach January 2021 in a rapidly evolving new world.

China and the UK need to have a pragmatic relationship for 2021 and beyond. There will be challenges to overcome, in particular in balancing trade and values, but this should not derail the global imperative to tackle the climate crisis.

I have been told that in the Chinese language one of the characters in the word weiji (危机) meaning 'crisis' also forms the start of another character jihui (机会) meaning 'opportunity'.

I firmly believe that if we can tackle the crisis of the Covid pandemic in 2020 and research, innovate and invent vaccines in record time then we can surely turn next year into a genuine opportunity for UK-China COP15 & COP26 cooperation and low carbon partnership.

Perhaps we might even turn a 'golden era' of UK-China collaboration into a new 'green era' for the years ahead.

气候变化

第 26 届联合国气候变化大会（COP26）：英中关系的新“绿色时代”？

卡兰 • 比利莫利亚，勋爵，英国工业联合会会长

卡兰 • 比利莫利亚
勋爵 上议院议员

会长
英国工业联合会

以创立受欢迎的全球啤酒品牌 Cobra Beer 而闻名，目前担任公司董事长。

除了从事商业活动外，比利莫利亚先生还是英国上议院议员，目前担任伯明翰大学校长，并担任英国工业联合会主席。

最近，总统当选人约瑟夫·拜登被确认为美国第 46 任总统，这流行病肆虐的一年里，全世界人民终于有理由庆祝一下。在特朗普总统的领导下，整个世界对“另一个”全球危机——气候变化的反应有脱轨的风险。与应对新冠肺炎一样，应对全球挑战的唯一方法就是采用全球统一的方法。

新冠肺炎大流行向我们展示了合作与协作的重要性。展望 2021 年，多边主义有望重新获得生机。这种希望能否成真将取决于世界上两个最大的碳排放国美国和中国，这两个国家碳排放总量占全球的 40%，在英国举行的第 26 届联合国气候变化大会上，这两个国家寻找在应对气候变化问题上的真正共同点。

英国在第 26 届联合国气候变化大会召开前率先做出大胆承诺，2050 年实现零排放，并力争到 2030 年减排 68%。中国国家主席习近平于 2020 年 9 月在联合国大会上表示，中国的二氧化碳排放力争于 2030 年前达到峰值，争取 2060 年前实现碳中和，我们对这一承诺感到意外但是非常欢迎，这无疑也将美国重新与国际社会接轨共同应对气候变化的问题置于聚光灯下。

美国的行动最初看起来是不错的，美国已经决定重新加入《巴黎协定》，而拜登政府将净零排放定为一项 2 万亿美元计划的核心，以“重建更美好未来”。

在这一雄心勃勃的议程中，美国计划重启《清洁空气法案》、规范发电厂、提高汽车能效标准，并推动制定一项对气候更友好的基础设施法案。

但是，由于中美之间的双边关系处于 50 年来的最低水平，并且美国参议院共和党人的反对可能对实施有意义的改革构成挑战，实现净零排放的道路将充满政治困难。

时间也没有支持他们，世界气象组织（WMO）宣布 2020 年将是自 1850 年有记录以来最热的三个年份之一。

另外，地球持续变暖导致西伯利亚近期气温创下新高，比平常的平均气温高出 5℃ 以上，世界上 80％的海洋和珊瑚礁每年至少发生一次海洋热浪或漂白事件。

但是，目前有 127 个以上的国家承诺到 2050 年实现碳中和，中国、美国、日本、韩国和欧盟也做出了不同承诺，因此实现《巴黎协定》目标——本世纪气温升高不超过 2℃ 看上去比以前更容易实现。

实际上，根据气候行动追踪组织（Climate Action Tracker）的数据，中国 2060 年实现碳中和的承诺估计在本世纪末会使气温变暖降低 0.2°C 至 0.3°C。

但是，我们没有自满的资格。

联合国秘书长安东尼奥·古特雷斯（Antonio Guterres）最近宣布，他希望建立一个全球联盟，专注于在 2050 年前实现净零排放，“每个国家、城市、金融机构和公司”都采用这一计划，对抗人类在地球上的“自杀式”战争。

广阔的亚马逊雨林总面积超过 11000 平方公里，相当于大伦敦区的 7 倍，在 2019 年 8 月至 2020 年 7 月间被夷为平地。这是一个能说明人类愚蠢行为的实例。

在目前定于 5 月 17 日至 30 日在中国昆明举行的第 15 届联合国生物多样性大会上，防止自然的无法补偿的进一步损失将是全球生物多样性众多重要问题之一。

第 26 届联合国气候变化大会将于 2021 年 11 月在格拉斯哥召开，这将是英国政治史上的一个重要里程碑。在英国离开欧盟以后，这次大会将成为展示其如何建立共识并在面对全球挑战方面发挥领导作用的机会。

为了取得成功，要说服美国和中国坐到谈判桌前，做出超越地缘政治和贸易问题的承诺。英国继续与中国保持强有力的双边关

不仅通过一系列政府间的对话，而且可能更重要的是通过包括商业、学术和研发在内的一系列领域的定期工作接触。

第 26 届联合国气候变化大会的准备工作已于 2020 年开始，大会主席阿洛克•夏尔马（Alok Sharma）与中国生态环境部部长黄润秋一直都有定期接触。

第 26 届联合国气候变化大会英国区域大使 Laurie Bristow KCMG 爵士也与中国驻英国大使刘晓明大使保持着联系。

英国新任驻华大使吴若兰（Caroline Wilson CMG）女士已经把低碳伙伴关系和“奔向零碳”计划作为英国在中国大陆外交交往的核心。

例如，在她 11 月份的第一次去广东省的地区之旅中，她前往深圳巴士集团，参观了比亚迪设计制造的第 26 届联合国气候变化大会品牌的电动双层巴士。两家公司都承诺支持英国的旗舰“奔向零碳”计划。

中国国有企业中国石油天然气集团公司（CNPC）也做出了备受欢迎的承诺，即在 2050 年之前成为“接近零”的企业，这对中国国有企业来说当然是首例。

在英中合作伙伴关系中，寻求发展“奔向零碳”的企业还包括 BP，该公司于 2 月与滴滴建立了合资企业，在广东的 19 个充电站建立了 340 个电动汽车充电站网络。

2021 年英中 COP15 和 COP26 五个相关的活动将巩固“奔向零碳”的企业承诺，这些活动的侧重点是气候适应能力、能源、金融、自然和交通。

鉴于计划的举措范围广泛，至关重要的是企业、政府和消费者密切合作，使 11 月举行的 COP26 取得成功。

实际上，11 年前，英国工业联合会在 2008 年的开创性的报告《气候变化——每个人的事业》就强调了这些不同的组织在共同应对气候变化的重要性。

我们的脱碳进程自此加速，今天我们讨论的是，在 1990 年以来已经实现的排放量减少 41％的基础上，我们如何实现向低碳经济过渡的下一阶段。

英国工业联合会的最新气候变化报告《我们的绿色复苏路线图》于 2020 年 9 月发布，强调了为创造绿色就业机会和实现 2050 年净零排放目标所需要的一些紧急政策决定。优先事项包括推进氢和碳捕集技术的政策框架，开展新的核能建设，以及转向电动汽车所需的基础设施和激励措施。

我是英国工业联合会和伯明翰大学热力政策委员会的联合主席，该委员会于 2020 年夏天报告了英国如何克服其最大的净零排放挑战之一，即脱碳热。这就提出了一个主题，即企业和政府共同努力，特别是提供切实可行的解决方案。

但是英国不能单独开展这方面的工作。低碳转型的速度和规模，为英国企业与中国企业在绿色金融、绿色氢研究、民用核能和远程电力传输等领域的合作提供了新的机遇。

可能英中合作中最最令人兴奋的领域可能是学术研究，英国在海上风力和潮汐方面拥有领先的研发能力和专业知识。

实际上，广东省刚刚建立了一个英中海上风电技术实验室。

依托与爱丁堡大学和上海交通大学的学术合作，中英国际低碳学院（LCC）荣获了 2019 年中国-苏格兰商业大奖“教育创新奖”。

中英两国的团队在可持续建筑、空气质量、能效和智慧城市等研究项目上进行了合作。

100 多名来自爱丁堡大学商业系、地球科学系、工程系、信息学系、法律系和化学系的学者，提供了“绿色途径”的想法，帮助他们建立和扩大构想，人才和技术，以应对气候变化挑战。

这些合作伙伴关系以及其他未被提及但非常重要的学术研究合作伙伴关系，构成了今年国际突破性疫苗研究的基础，在过去的几周中，至少宣布了三种新冠病毒疫苗。

英国学术界将继续努力寻找新的低碳解决方案，以满足我们经济的需要。例如，在私营企业与伯明翰大学之间的合作下，今年在英国干线上测试了第一列氢动力火车。保持和深化这些连结不仅对个人和机构，而且对人类本身都至关重要。

在我作为英国工业联合会主席的不平凡的头六个月即将结束之际，作为英国企业的代言人，我为我们的工作感到非常自豪，也意识到，随着 2021 年 1 月的临近，在这个快速发展的新世界中，我们的成员、社会和国际政府所面临的巨大挑战。

2021 年及以后，中英两国要建立务实的关系。我们还会有挑战需要克服，尤其是在平衡贸易和价值观方面，但是这不应该阻碍应对气候危机的全球任务。

有人曾告诉我，在中文中，“危机”的机有危险的意思，但是同时它也是另一个词组“机会”的第一个汉字。

我坚信，如果我们能够在 2020 年应对新冠肺炎大流行危机，并以创纪录的时间研发、创新和发明疫苗，那么我们肯定会在明年为英中 COP15 和 COP26 合作以及低碳伙伴关系提供真正的机遇。

未来几年，也许我们能够将中英合作的“黄金时代”转变为新的“绿色时代”。

Future of Education

Some Thoughts on the Future of Higher Education After COVID

Professor Christoph Loch, Dean of Cambridge Judge Business School

We have now lived with the COVID19 pandemic for one year. We're tired of it, and we would like our lives to go back to where they were before. But that won't happen --- some changes in education will stay and even be accelerated. I am not involved in primary and secondary education, so I will focus my comments on higher education (universities and colleges).

Something that will not happen is that (higher) education will simply go online. The demise of face-to-face education has been predicted repeatedly, first, when radio arrived in the 1930s, then again when TV appeared in the 1960s, and again when the Internet exploded in the 1990s. It hasn't happened, and it won't, because such a big element of higher education resides in social skills and networking. During the various COVID 19 lockdowns, we have been forced to accept how much technology can really do (more than conservative education institutions were willing to admit before). Big changes are afoot. They will bring new combinations of online and face-to-face teaching, and winners and losers will be chosen by how creative and flexible they will be in offering value to students with combinations.

Let's clarify some terms: "Online education" (as opposed to "face-to-face" or "f2f") is not one thing. There are live online lectures (which may be given to huge groups, like speeches, or small groups, with discussions), there are "asynchronous" pre-recorded materials for large audiences (like the "massive open online courses" (MOOCs) that started getting attention 10 years ago but that will not change the structure of education and are waning, turning into mere Marketing materials), there are asynchronous materials with sophisticated pedagogical multi-media pieces embedded and application exercises (which may even be graded), and there are gamified experiences that evaluate what you do (and learn) with sophisticated AI algorithms. Moreover, asynchronous offers can be combined with live-online webinars or coached sessions where debates and feedback happen. Combined offers can become at least as sophisticated as good f2f offers, and these offers certainly do not involve "masses" of students but relatively small groups, just like f2f does; and these sophisticated offers can achieve better outcomes than f2f.

First ("undergraduate") Degrees

Most people, when speaking about universities, have in mind undergraduate education, the first 2-4 years of study after high school graduation, in a broad

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His research revolves around the management innovation processes in organizations, including strategy cascading, project selection, concurrent engineering, project management under high uncertainty, collaborative problem solving, and performance measurement.

He also examines the emotional aspects of motivation and performance for professional personnel (such as R&D organizations).

field (such as “humanities”) or a narrow field of interest (such as engineering or law).

The “factual” part will likely go online: careful pedagogy, focus on “the best”, embedding of sophisticated tools (animations, case studies, simulations, exercises, interviews), individualized assessment with the help of technology (such as AI), convenience (can be watched wherever and whenever, can be “wound back” and played when the student has not understood something). Current concerns about assessment (“we cannot see whether the student uses additional materials in the exam, we cannot even certify the identity of the test taker”) are details and will be solved.

But such a big part of undergraduate education is growing up, learning social skills, building networks, and building self-confidence, and these outcomes require social interaction. Therefore, elements of f2f will remain.

This is especially true in the selective schools for the children of the privileged, where deeply embedded self-confidence, culture and values are as important outcomes as knowledge; these will remain in f2f institutions (often with boarding houses) where esprit the corps and identity are internalized.

It is much less true on the other end of the spectrum, where, for example, India has a gigantic unmet need for education; serving this need (and unlocking the huge talent potential of the country) would require not 50,000 teachers to be hired but 50,000 universities to be built! This can simply not be met by f2f institutions. Should India’s educational institutions really step up to this gigantic opportunity, they will develop extremely sophisticated and creative approaches to purely online college education, with most of it in asynchronous pedagogical modules of high sophistication and interactivity, both delivered and assessed in individualized ways helped by technology, and supported by a (perhaps small) part of very effective online networking, collaborating, interacting, with the help either of an army of mentors, or perhaps (a bit more long term) even AI-underpinned artificial personalities. If India does grab this challenge to turn it into an opportunity, it could (indeed should) become a worldwide leader in higher education within one generation.

A key element that is often not discussed is the teaching of “independent and critical thinking”. This must be addressed in undergraduate education; it is too late in graduate degrees. The sophisticated problems addressed by organizations in advanced economies pose problems of uncertainty, of interrelatedness and “externalities”, or side effects imposed by organizations on their society, and sophisticated learning includes the functioning of the political system, including inequality, the concentration of power and accountability of the de facto power holders in a society.

I am of course aware that Chinese culture believes you need to master the fundamentals in order to be equipped to think independently and/or be creative. I recognize this from my own upbringing, where for example a discussion raged that before discussing trade-offs of regional policy in the country, the students first needed to learn the basics by, for example, memorizing the nations' and regions' capital cities! And this is, of course, true, but there is always another side, namely that if you are socialized to only memorize and obey until you are 20, creativity will never fully develop. There is ample evidence that creativity and the ability to produce novelty is developed during childhood (except for the very few exceptions who are creative no matter how they are treated when young).

The ability to be creative comes with the ability to recognize facts, to go through some kind of explicit reasoning (weighing possible considerations), and to come to conclusions that one can defend. In many Western countries, there is a worry about the large number of people who do not have the capability to check facts and cannot reason explicitly about them, who then become the victims of misinformation from the internet, fake news, and political manipulation.

China has performed incredibly well in the last two generations and it is at the brink of global leadership. To push beyond the state of the art, creative people who think independently are needed more than ever. In China, as in the West, there is a worry about people being misled. In particular, as China is about to take up the leadership position among countries in the world, it needs young people who develop to think independently and to be creative. The Chinese authorities have more legitimacy and trust than authorities in most other countries. This suggests that the Chinese authorities should become, and can be, more comfortable with different views --- there are always multiple possible views, and reasonable people can disagree. A difference of opinion does not have to spiral into a loss of control. Allowing different views expresses the self-confidence and openness to become even better.

This is what a functioning higher education sector can bring to a country, not just technical competence but also openness and a diversity of opinions that is the root of creativity.

Second ("graduate" and post experience) Degrees

Postgraduate Education is more about competence and skills than about "critical thinking", as the students at the time of their graduate studies will have built their personalities (although critical thinking certainly does not become less important).

Similarly, as for undergraduate education, technology and asynchronous pre-recorded, sophisticated pedagogy will make a large inroad. Carefully designed materials can convey complex scientific subjects even better than live teachers, and even some types of lab work can be simulated in gamified ways that are as effective as live lab studies --- lab studies will not disappear, but will become more focused.

But the strengthening of social and influencing skills and networks is even more important, as is the application of skills in labs, projects and practice in live organizations. This is certainly true for graduate business students. In classrooms, we teach the students concepts, but connecting the concepts to reality happens in projects in live companies. This will not change (much).

Therefore, I expect that asynchronous teaching will gain a significant piece of degree courses. Some of the networking and social skills (including networking in subgroups, even raising a glass to one another in social events) will also be addressable in the live online format. Purely online graduate degrees (with a mixture of pre-recorded and live online sessions) will conquer the majority of all students.

Only well-known and established universities will have the "market draw" enabling them to offer courses with a significant f2f component, where the students will actually have to go to the institution (or the institution comes to them, in another part of the world). These will be "elite" courses. The top universities will vigorously compete to attract these student populations because they will represent elites from across countries and cement these universities' positions in influential networks. The universities unable to maintain a presence in (the small number of) these majority-f2f courses will fall out of the top group. But this is a risky period. We have seen over the last 150 years that whenever industries change this much, some establish players will fail to keep up and will disappear, and other non-established players will, with cleverness and innovation leapfrog into the top group and become the new establishment. This will happen in higher education too (it is actually already happening, as the recent rise of Chinese Universities to the global top attests).

Professional, executive and ongoing (lifelong) education

Professional and executive education is an opportunity for business schools (and universities more widely) to

- reach senior people practicing trades, interact with them and widen networks
- offer value that help the practicing professionals in their professional lives and the performance of their organizations

- for the faculty of the institutions offering such courses to learn about trends, current issues, and emerging ideas in the "huge laboratory of existing organizations;" this would help a more embedded interaction between universities and businesses (and organizations more widely), addressing the regularly re-appearing accusations that universities are too isolated from practice
- to address the emerging requirement and trend from "exclusively pre-career education" toward "lifelong learning." This supports the ability for professionals to stay in touch with state-of-the art methods and to maintain the habit of learning, and it supports the university faculty to stay in touch with the latest ideas in the world of practice, and the university organizations to stay in touch with their alumni networks.

After as little as one year operating under the forces of COVID19, my business school sees evidence that many executive education courses can be offered completely online (in a combination of high-quality pedagogical asynchronous materials and live online interactions, which include "social" interactions among the participants). I expect this trend to play out strongly as soon as in the next five years. F2f elements would be focused to a minority of a few focused courses and to specific events (such as graduation) where networking is the key function. Only "elite" programmes (such as discussion groups among CEOs) would remain f2f exclusively.

Executive education is seeing the largest effect from "market entry" from organizations outside the higher education sector, for example, from consulting companies, publishing houses and most significantly, from "corporate universities". (Market entry is suppressed by most countries' laws that restrict degree-awarding to a small set of certified educational institutions, namely universities. This protection for degree awarding is being softened a bit around the edges at the moment, but is unlikely to disappear in the near future.)

All of these players from outside the higher education sector are addressing "lifelong" learning and "problem solving" elements of executive education. It is quite unclear at the moment whether the online revolution will favour market entry or the higher-education incumbent: on the one hand, the pedagogical experience and the experience of linking pedagogy, academic research and industry applications that business schools and universities have given them a strong advantage, and if they are entrepreneurial and flexible, they have the opportunity to build on this advantage. On the other hand, some universities view their activities narrowly and have "culturally embedded" resistance to the new opportunities (as I say this, I have a handful of specific universities in mind, both in the UK and in China). If the universities fail to address this huge opportunity, they will be pushed aside by market entrants; this would be very damaging to universities in the long run, as the

entrants would, based on demonstrated success in lifelong learning, renew their efforts (and probably successes) in entering degree programmes also.

Conclusion

The end effect of all of this is good for students. Higher Education is an industry like other industries, where multiple players (some state owned and some private) compete for the access to talented students (although they make the students feel like they in turn compete for the access to good universities!). Therefore, technological shifts that are accelerated by demographic and social shifts (such as the ones caused by COVID) can change competitive stability and cause turmoil. I think turmoil is what we will see in the next 20 years --- a change of perhaps 50% in the list of the global top 100 universities. The opportunities are huge, and so are the risks. I think that the result for students will be positive --- a rapid avalanche of changed approaches to their education that will bring innovation faster than the established universities would be able to develop if not pushed to the brink.

对新冠疫情后高等教育未来的一些思考

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新冠肺炎大流行已经持续了一年的时间。我们已经厌倦了这样的日子，我们希望我们的生活回到没有新冠肺炎时的样子。但是，这是不可能的——新冠肺炎给教育带来的变化将会持续下去，并且这种变化会加速。我工作的领域不包括初等教育和中等教育，因此我的思考将集中在高等教育（高校）。

有一点是不会发生的，那就是（高等）教育只会在网上进行。人们曾多次预言面授教育的消亡，最开始是 20 世纪 30 年代广播出现时，然后是 20 世纪 60 年代电视出现时，再然后就是 20 世纪 90 年代互联网爆发时。但是，这种预言没有成真，而且以后也不会，因为，高等教育的一个重要因素在于它的社交技能和社交网络。在新冠肺炎的大封锁期间，我们被迫接受了技术所具有的真正本领（这比保守派教育机构以前愿意接受的要多）。巨大的变化正在发生。在线教育和面授教育相结合的新的教育形式将会出现，孰胜孰负将取决于它们为学生提供价值时如何创造性和灵活性地运用这种组合。

我们来澄清一些问题：“在线教育”（与“面授教育”相对而言）并不仅仅是一个概念。它包括在线讲座（可能针对大型小组，例如演讲或小组讨论）、针对大量观众的“不同步”预录制材料（例如“大规模开放在线课程”（MOOC），这种课程 10 年前开始受到关注，但是不会改变教育结构，而且它正在逐渐消失，变成了一种营销材料），也包括其中含有复杂教学多媒体片段和应用练习（甚至可以分级）的不同步材料，还包括通过复杂的 AI 算法评估您所做事情（和学习）的游戏化体验。另外，不同步材料还可以与在线研讨会或者有辩论和反馈的辅导课程相结合。这种结合课程至少可以和优秀的面授课程一样复杂，当然，这些课程不会涉及“大量”学生，而是面对相对较小的群体，就像面授课程一样。并且，这种复杂的课程可以获得比面授教育更好的结果。

第一学位（“本科”）

当谈论大学时，大部分人会想到大学本科教育，即高中毕业后的最初 2-4 年在一个广泛领域（例如“人文教育”）或一个狭窄兴趣领域（例如工程或法律教育）的学习。

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洛赫自 2011 年起担任剑桥大学嘉治商学院院长。

他的研究围绕组织中的管理创新过程进行，包括策略级联，项目选择，并发工程，高度不确定性下的项目管理，协作问题解决和绩效评估。

他的研究还针对专业人员（例如研发组织）的动机和绩效情感方面的课题。

在线教育可能有一些“事实”上的优点：教学法认真、专注于“最佳”、加入复杂的工具（动画、案例研究、模拟、练习、访谈）、借助技术（如 AI）进行个性化评估，方便（可在任何时间任何地点观看，当学生有不理解的内容时刻“退回”播放）。目前对评估的担忧（“我们无法看到学生是否在考试中使用其他材料，我们甚至不能证明考生的身份”）是细节问题，以后这个问题将会得到解决。

但是，本科教育的一个重要部分是成长、学习社交技能、建立人际网络、建立自信，而这些都需要社交互动。因此，面授教育的元素将会保留下来。

在那些专为特权阶层孩子开设的精英学校里尤其如此，在那些学校里，根深蒂固的自信、文化和价值观与知识一样重要。面授教育机构（通常有寄宿处）将保留这些特质，在那里，精神、团队和身份被内化。

在另一种情况下，情况就不那么乐观了。例如，印度有巨大的教育需求未得到满足。为了满足这种教育需求（并释放这个国家巨大的人才潜力），需要的不是 5 万名教师，而是 5 万所大学! 单单通过面授教育根本无法满足这种需求。如果印度的教育机构真的能抓住这个巨大的机会，他们将开发极其复杂和富有创造力的方式来进行纯在线大学教育，大部分可以通过高度复杂和互动不同步教学模块实现，在技术的帮助下以个性化的方式进行交付和评估，由非常有效的在线网络（可能很小）、协作和互动提供支持，并由导师团队提供帮助，或者甚至可能（更长远的角度）由 AI 支持的人造人格提供帮助。如果印度确实抓住这一挑战将其转化为机遇，那么它可能（确实应该）在一代人的时间内成为全球高等教育的领导者。

这其中有一个没有被经常讨论但是很关键的因素是“独立性和批判性思维”的教学。这个问题必须在本科教育阶段解决，如果到研究生阶段就太晚了。发达经济体的组织所解决的复杂问题造成了不确定性、相互关联性和“外部性”的问题，或是这些组织对其社会带来了副作用，并且复杂的学习包括政治体系的运转，包括不平等、权力集中和社会中实际权力持有者的问责制。

我当然知道，中国文化认为你需要掌握基础知识，才能具备独立思考和/或创新的能力。我是从自己的成长经历中认识到这一点的，例如，在一场激烈的讨论中，学生们在讨论该国区域政策的权衡取舍之前，首先需要学习一些基础知识，例如背诵国家和地区的

首府城市名称！当然，这种做法是正确的的，但是会存在另一个问题，那就是如果你在社会化的过程中只进行背诵和服从，那么你的创造力直到 20 岁也不会被完全开发。有充分的证据表明，创造力和创造新颖性的能力是在童年时期开发的（除了极少数之外，不管他们在幼年时受到怎样的对待，依然具有创造力）。

具备创造力的能力包括识别事实、进行某种明确推理（权衡可能需要考虑的因素）以及得出自己可以辩护的结论的能力。在很多西方国家，令人担忧的是，许多人没有能力核查事实，无法明确对其进行推理，因此他们会成为互联网、虚假新闻和政治操纵等虚假信息的受害者。

中国在过去两代人的时间里表现得非常出色，而且即将成为全球领导者。为了超越现有的技术水平，我们比以往任何时候都需要能够独立思考的有创造力的人。在中国，就像在西方国家一样，人们担心会被误导。尤其是，随着中国即将在世界各国中占据领导地位，它需要那些具有独立思考和创造能力的年轻人。与世界上大部分其他国家相比，中国当局拥有更多的合法性和信任度。这表明，中国当局应该也可以更乐于接受不同的观点，因为通常都会存在多种可能的观点，有理性的人可以不同意。意见的分歧不一定意味着失控。允许存在不同的观点，证明了自信和开放性，会变得更好。

这些就是一个良好运转的高等教育部门可以带给一个国家的东西，不仅是技术能力，还有创造力的根基：开放性和多样性。

第二学位（“研究生”）

研究生教育更多注重的是能力和技能，而不是“批判性思维”，因为学生在研究生阶段的学习中要建立起自己的个性（尽管批判性思维肯定不会失去重要性）。

同样，对于本科教育、技术和不同步预先录制而言，成熟的教学方法将会取得很大进展。经过精心设计的材料可以比现场教师更好地传达复杂的科学主题，甚至某些类型的实验室工作也可以通过游戏化的方式模拟出来，就像真实的实验室研究一样有效——实验室研究不会消失，而是会变得更加有侧重点。

但是，更重要的是加强社会和影响力技能和网络，以及在实际组织中的实验室、项目和实践中应用技能也是如此。这对商学院的研究生来说无疑是正确的。在教室里，我们教学生概念，但将概念

与现实联系起来的项目是在实际公司里进行的。这些不会改变（太多）。

因此，我期待异步教学将会在学位课程中获得一席之地。一些人际社交和社交技巧（包括在小组中进行社交，甚至在社交活动中互相举杯）也可以通过在线方式来实现。纯粹的在线研究生学位（包括预先录制的在线课程和实时在线课程的混合）将征服大多数学生。

只有那些知名的大学才有“市场吸引力”，它们才能提供面授教育占很大比例的课程，选择这些大学的学生们需要真正来到大学（或者在世界另一端的大学走近他们）。这些将是“精英”课程。顶尖大学将大力竞争以吸引这些代表各国精英的学生群体，并巩固这些大学在有影响力的网络中的地位。那些无法维持占有很大比例的面授课程（少数）的大学将会掉出顶尖大学的队伍。但这是一个危险的时期。在过去的150年中，我们已经看到，每当行业发生如此大的变化时，一些知名企业无法跟上队伍，最终消失，而其他一些并非知名的企业将凭借智慧和创新，一跃成为顶级企业，成为新的知名企业。这种情况也将发生在高等教育领域（事实上，这种情况已经发生，最近中国大学崛起成为全球顶尖大学证明了这一点）。

职业教育、管理教育和持续（终身）教育

对于商学院（以及更广义上的大学）而言，职业教育和管理教育是一个机会

- 能够接触到所从业行业的资深人士，接触他们并扩大人际网络
- 提供对其职业生涯及在组织中的表现有帮助的价值观
- 使提供此类课程的机构的教职工能够在“现有组织的庞大实验室”中了解趋势、当前问题和新出现的想法；这将有助于大学与企业之间（以及更广泛的组织之间）进行更加嵌入式的互动，解决反复出现的对于大学过于脱离实际的指责
- 应对从“完全职业前教育”到“终身学习”的新兴需求和趋势。这对职业人员保持通晓最先进方法并保持学习习惯起到支持作用，并支持大学教职工了解最新概念，支持大学组织与校友网络保持联系。

在新冠肺炎的压力下运营了短短一年之后，我的商学院发现，有证据证明，很多管理教育课程可以全部提供在线课程（结合高质量的不同步教学材料以及实时在线互动，其中包括参与者之间的“社交”互动）。我预计这一趋势将在未来五年内迅速显现出来。面授将会集中在少数几个社交人际是关键因素的重点课程和特定事件（例如毕业）中。只有“精英”课程（例如 CEO 之间的小组讨论）才会保留面对面的形式。

管理教育的最大影响是来自高等教育领域以外的组织的“市场准入”，这些组织包括咨询公司、出版社，最重要的是包括“企业大学”。（大多数国家的法律将学位授予限制在一小部分经过认证的教育机构，即大学，这就限制了市场准入。这种对学位授予的保护目前正在松动，但是不可能会在很短时间内消失。）

所有这些高等教育领域之外的参与者都在探讨管理教育的“终身”学习和“问题解决”要素。目前还不清楚互联网革命是否会有助于市场准入或高等教育：一方面，商学院和大学的教学经验以及将教学、学术研究和行业应用相结合的经验成为它们的强大优势，如果这些商学院和大学具有创业精神和灵活性，它们就有机会利用这一优势进一步发展。另一方面，有些大学看待自己的活动时非常狭隘，并且对于新的机遇有“文化上的根深蒂固”的抵制（当我谈论这一点时，我会想起英国和中国的几所大学）。如果这些大学不能抓住这个巨大的机遇，它们将会被市场上新进入场的成员挤到一旁。从长远来看，这将对大学造成极大的损害，因为根据在终身学习中取得的成功经验，这些新进入场的成员会继续努力进入学位课程（并且可能会成功）。

结论

这一切对于学生而言都是好的。高等教育和其他行业一样，在这个行业中，很多参与者（有些是国有，有些是私有）在竞争获得优秀学生的机会（尽管他们让学生觉得好像是学生在竞争进入优秀大学的机会）。因此，由人口结构和社会变化（例如由新冠肺炎造成的社会变化）加速的技术变化可能会改变以前的竞争稳定状态，引发动荡。我认为，动荡是未来 20 年我们将会看到的主题，全球前 100 所大学名单中有 50%会发生变化。机遇是巨大的，风险也是巨大的。我认为，这个结果对于学生而言是积极的——他们的教育方式正在发生雪崩式的迅速变化，这些变化带来的创新要比知名大学发展的速度还要快，前提是这些知名大学还没有被淘汰出局的话。

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