SUSS
SINGAPORE UNIVERSITY OF SOCIAL SCIENCES

Study Guide

Centre for University Core

SCO104
Globalisation and Technology

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Globalisation and Technology

1. Welcome

Presenter: Dr Benjamin Choo

This streaming video requires Internet connection. Access it via Wi-Fi to avoid incurring data charges on your personal mobile plan.

Click here to watch the video. [i]

Click here for the transcript.

Welcome to the course ***SCO104 Globalisation and Technology***, a 2.5 credit unit (CU) course.

This Study Guide will be your personal learning resource to take you through the course learning journey. The guide is divided into two main sections – the Course Guide and Study Units.

The Course Guide describes the structure for the entire course and provides you with an overview of the Study Units. It serves as a roadmap of the different learning components within the course. This Course Guide contains important information regarding the course learning outcomes, learning materials and resources, assessment breakdown and additional course information.

[i] https://suss.ap.panopto.com/Panopto/Pages/Viewer.aspx?id=264777d0-b138-400b-ada5-ae7400590c0f&start=0

2. Course Description and Aims

This course invites students to think critically about the interaction between technological change and the globalisation cycle. This is a crucial dynamic that has and will continue to shape Singapore, Southeast Asia, and the world. Technological change in the digital age has played a key role in deepening the integration of global markets and in quickening the diffusion of ideas, knowledge, and technologies. Ironically, these processes have also unleashed forces that have blunted or even reversed the momentum for further economic integration and political cooperation on a global basis. The impact of the digital age on the globalisation cycle has also raised questions on a host of issues, including the resurgence of great power competition, the ability of the global economy to accommodate distinctive (and sometimes opposing) economic systems, the use of global technology supply chains as geopolitical weapons, the nationalistic pursuit of technological might, and the integrity of the nation state. These questions are not new and are merely the current form of prior debates concerning the impact of technological change in earlier globalisation cycles. In short, globalisation is neither irreversible nor inevitable. This course will impart this central lesson to students by placing globalisation and de-globalisation in the digital age within the context of historical globalisation cycles.

Course Structure

This course is a 2.5-credit unit course presented over three weeks.

There are three Study Units in this course. The following provides an overview of each Study Unit.

Study Unit 1 – Technological Change and the Globalisation Cycle

Please note that there are two chapters in Study Unit 1: (1) Technological Change and the Globalisation Cycle, and (2) The Diffusion of Technology across Time and Space. Study Unit 1 introduces and discusses three central questions: (a) What is globalisation, (b) What is technology, and (c) what is the relationship between technology and

globalisation. Study Unit 1 provides a foundation to understand these questions in both historical and contemporary contexts. This is to facilitate application of key concepts, such as globalisation, technological innovation (and indeed the idea of innovation itself) and technological diffusion, to socio-economic and geo-poltiical situations, such as the tensions between global forces and national or local imperatives and their consequent impact on international relations. It is also hoped that the ideas, themes, concepts, questions, and debates illustrated in this Study Unit will strengthen your ability to recognise the causes and consequences of global issues/trends and to understand that complex local and global issues may impact different segments of society differently and thus cannot be easily resolved.

Study Unit 2 – Globalisation in the Digital Age

Please note that there are two chapters in Study Unit 2: (1) The Impact of the Digital Age on Globalisation and (2) Technological Change and Diffusion in the Digital Age. Study Unit 2 explores and discusses several implications of globalisation in the specific context of the Digital Age. These can include the movement of people, goods and ideas across borders, the impact of Information and Communication Technologies (ICT) on those movements – particularly in differentiating between physical and digital globalisation, and the impact of digital technologies on the concepts of globalisation and degloblisation. Central to these issues is the evolving roles and responsibilities of the individual living in increasingly diverse and complex local and global communities. Study Unit 2 provides a foundation from which students are encouraged to imagine ways in which the individual can advocate for local and global issues and to effect sustainable change for the betterment of others and society in general.

Study Unit 3 – The Politics of Globalisation in the Digital Age

Please note that there are two chapters in Study Unit 3: (1) The Nation State in the Digital Age and (2) International Politics in the Digital Age. Study Unit 3 applies the themes of globalisation and technology and related issues to the contexts of the nation-state as well as of the nation-state in regional and international situations. The emergence and

entrenchment of digital technologies in the twenty-first century has not only resulted in intra-national dislocations and pressures, they have also been used in either provoking or sustaining territorial conflicts and diplomatic tensions. National governments have responded to the multifaceted impact of digital technologies. They have been harnessing and developing its potential to strengthen its policies, e.g. Singapore's Smart Nation initiative, and to collaborate across national borders, e.g. the ASEAN Smart City Network (ASCN). At the same time, national governments have also introduced legislative measures to regulate Big Tech and to curb the excesses of its products. Topics in this Study Unit will facilitate discussion to better understand how various nations in the world, including Singapore, take steps to protect its national interests and to defend its sovereignty and territorial integrity in the Digital Age.

3. Learning Outcomes

Knowledge & Understanding (Theory Component)

By the end of this course, you will be able to:

- Explain the meaning of globalisation and de-globalisation.
- Describe the impact of technological change on the globalisation cycle.
- Identify the factors that encourage or discourage technological change and the diffusion of technology across time and space.

Key Skills (Practical Component)

By the end of this course, you will be able to:

- Discuss the impact of the digital age on globalisation.
- Examine the impact of technology firms (e.g. Big Tech) on international economic and political affairs.
- Develop critical perspectives on technological determinism in the digital age.

4. Learning Material

The learning materials to complete this course are optional online resources and are indicated in the Reference sections of the Study Guide.

5. Assessment Overview

The overall assessment weighting for this course is as follows:

Assessment	Description	Weight Allocation
Assignment 1	Pre-Course Quiz	10%
Assignment 2	Group-Based Discussion Board Assignment	40%
Assignment 3	Tutor-Marked Assignment	50%
TOTAL		100%

The following section provides important information regarding Assessments.

Continuous Assessment:

There will be continuous assessment in the form of a computer-marked pre-course quiz (PCOQ), a group-based discussion board assignment (DB01), and a tutor-marked assignment (TMA01). In total, this continuous assessment will constitute 100 percent of overall student assessment for this course. The three assignments are compulsory and are non-substitutable. These assignments will test your ability to identify, evaluate and produce arguments. It is imperative that you read through your assignment questions and submission instructions before embarking on your assignment.

Passing Mark:

To successfully pass the course, you must obtain a minimum passing mark of 40 percent average for the three Overall Continuous Assessment components. For detailed information on the Course grading policy, please refer to The Student Handbook

('Award of Grades' section under Assessment and Examination Regulations). The Student Handbook is available from the Student Portal.

Non-graded Learning Activities:

Activities for the purpose of self-learning are present in each study unit. These learning activities are meant to enable you to assess your understanding and achievement of the learning outcomes. The type of activities can be in the form of Quiz, Review Questions, Application-Based Questions or similar. You are expected to complete the suggested activities either independently and/or in groups.

6. Course Schedule

To pace yourself and monitor your study progress, pay special attention to your Course Schedule. It contains study-unit-related activities including Assignments, Self-Assessments, and Examinations. Please refer to the Course Timetable on the Student Portal for the most current Course Schedule.

Note: Always make it a point to check the Student Portal for announcements and updates.

7. Learning Mode

The learning approach for this course is structured along the following lines:

a. Self-study guided by the study guide units. Independent study will require ***at least 3 hours per week.***

b. Working on assignments, either individually or in groups.

c. Classroom Seminars (3 hours each session, 3 sessions in total).

iStudyGuide

You may be viewing the interactive StudyGuide (iStudyGuide), which is the mobile-friendly version of the Study Guide. The iStudyGuide is developed to enhance your learning experience with interactive learning activities and engaging multimedia. You will be able to personalise your learning with digital bookmarking, note-taking, and highlighting of texts if your reader supports these features.

Interaction with Instructor and Fellow Students

Flexible learning—learning at your own pace, space, and time—is a hallmark at SUSS, and we strongly encourage you to engage your instructor and fellow students in online discussion forums. Sharing of ideas through meaningful debates will help broaden your perspective and crystallise your thinking.

Academic Integrity

As a student of SUSS, you are expected to adhere to the academic standards stipulated in the Student Handbook, which contains important information regarding academic policies, academic integrity, and course administration. It is your responsibility to read and understand the information outlined in the Student Handbook prior to embarking on the course.

Study Unit 1

Globalisation and Technology: An Overview

Learning Outcomes

By the end of this unit, you should be able to:

1. Explain the meaning of economic globalisation and economic de-globalisation.
2. Discuss the question of whether or not globalisation is irreversible and inevitable.
3. Describe the relationship between globalisation and technology.
4. Identify the multiple meanings and connotations of technology.
5. Describe the main features of technologically deterministic perspectives.
6. Develop a critique of technological determinism.
7. Examine the respective roles of the state and private economic agents in driving technological change, adoption, and diffusion.

Overview

Study Unit 1 introduces and discusses three central questions: (a) What is globalisation, (b) What is technology, and (c) what is the relationship between technology and globalisation. Study Unit 1 provides a foundation to understand these questions in both historical and contemporary contexts. This is to facilitate application of key concepts, such as globalisation, technological innovation (and indeed the idea of innovation itself) and technological diffusion, to socio-economic and geo-poltiical situations, such as the tensions between global forces and national or local imperatives and their consequent impact on international relations. It is also hoped that the ideas, themes, concepts, questions, and debates illustrated in this Study Unit will strengthen your ability to recognise the causes and consequences of global issues/trends and to understand that complex local and global issues may impact different segments of society differently and thus cannot be easily resolved.

Lesson Recording

Case Study: The Shipping Container and Globalisation

Chapter 1: Technological Change and the Globalisation Cycle

1.1 What is globalisation?

As an economic phenomenon, globalisation refers to the integration of global markets for goods, services, capital, labour, and ideas.[1] As will be shown below, globalisation is driven by many factors. One of these factors is the emergence and deployment of new technologies (e.g. new forms of transport) that reduce the costs and increase the speed and the ease of moving goods, capital, labour, and ideas across different markets.[2] Thus, the intensification of economic globalisation will usually be reflected in the growth of international trade (i.e. countries are importing/exporting more goods and services from/to each other), the growth of cross-border capital movements (i.e. countries are borrowing/lending more from/to each other; or investing more in each other), and the growth of international migration (i.e. more people are crossing national/political borders in order to find employment or for other reasons).[3]

It is, of course, not compulsory for all countries to integrate themselves with the global market. A country may choose, perhaps for political or ideological reasons, to pursue economic self-sufficiency or autarky. What does this mean? This means that the country will severely limit and control all forms of economic exchange (e.g. trade and capital movements) with foreign countries *and* choose to rely on its internal economic resources.

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[1] Manfred B. Stenger, *Globalization: A Very Short Introduction* (Oxford, 2020), p. 38; and Richard Baldwin, *The Great Convergence: Information Technology and the New Globalization* (Cambridge, MA, 2016), p. 113.

[2] Baldwin, *The Great Convergence*, pp. 113-141; and Barry Eichengreen, *Globalizing Capital: A History of the International Monetary System, 3rd edition* (Princeton, NJ, 2019), p. 128.

[3] Harold James, *The Creation and Destruction of Value: The Globalization Cycle* (Cambridge, MA, 2009), p. 11.

This means, for example, that the residents and entities based in an autarkic country will only import/export a low quantity of goods and services from/to other countries.[4]

The concept of autarky will help us to understand the meaning of economic de-globalisation. Simply put, de-globalisation refers to the reversal of globalisation. Thus, as an economic phenomenon, de-globalisation will usually be reflected in the decline of international trade, cross-border capital movements, and international migration.[5] When taken to its logical and extreme conclusion, economic de-globalisation will result in the emergence of autarkic or semi-autarkic economies.

1.1.1 When did globalisation begin?

The term 'globalisation' only gained wide currency in the 1990s.[6] But activities that echo the definition of economic globalisation presented above can be detected in earlier periods. Thus, 'globalisation' is not a new economic phenomenon. But how old is it? Scholars largely agree that 'globalisation' is not new, but they disagree as to how old it is. Did 'globalisation' commence hundreds of years ago or perhaps even thousands of years ago?[7] The economists Kevin O'Rourke and Jeffrey G. Williamson have argued that 'globalisation' began in the 1820s.[8] They arrived at this conclusion by taking the narrowing of prices differences between similar commodities sold in different parts of the world as the main outward sign of successful globalisation.[9]

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[4] This entire paragraph draws on Jeffry A. Frieden, *Global Capitalism: Its Fall and Rise in the Twentieth Century* (New York, 2006), pp. 191, 197-198 and 204-209.

[5] James, *The Creation and Destruction of Value*, pp. 119-120.

[6] Stenger, *Globalization*, p. xxviii.

[7] Kevin H. O'Rourke and Jeffrey G. Williamson, 'When did globalisation begin?', *European Review of Economic History*, 6(2002), pp. 23-24.

[8] Ibid., p. 28.

[9] Ibid., pp. 24-26.

1.1.2 Is globalisation 'irreversible' and 'inevitable'?

In our contemporary world, political and business leaders are fond of proclaiming that globalisation is 'irreversible' and 'inevitable'.[10] Nothing could be further from the truth. History shows that the world has gone through cycles of economic globalisation and economic de-globalisation.[11] There is no reason to expect the future to be any different. Indeed, it has been observed that the pace of globalisation has decelerated since the shock of the global financial crisis of 2007-2008.[12] The global rise of populism and economic nationalism in recent years, as well as the economic and political fallout of the pandemic, have also led many observers to wonder if de-globalisation will deepen in the coming years.[13]

Standard narratives of modern economic globalisation tend to speak of a so-called 'first globalisation' that spanned the late nineteenth century and the start of the

[10] See, for example, 'President Quang: Globalization is Inevitable and Irreversible', *APEC*, 16 May 2017, at https://www.apec.org/Press/News-Releases/2017/0516_tran, accessed 19 October 2021; and 'Globalisation can't be stopped; if trade halts, war will follow: Jack Ma', *The Economic Times*, 24 January 2018, at https://economictimes.indiatimes.com/news/international/world-news/globalisation-cant-be-stopped-if-trade-halts-war-will-follow-jack-ma/articleshow/62637665.cms, accessed 19 October 2021.

[11] James, *The Creation and Destruction of Value*, pp. 10-12.

[12] Finbarr Livesey, *From Global to Local: The Making of Things and the End of Globalization* (New York, 2017), pp. 9-12.

[13] See, for example, Pradumna Bickram Rana, 'Covid-19 and Its Impact: Is Globalisation Dead?', *RSIS Commentary*, No. 064, 20 April 2021, at https://www.rsis.edu.sg/wp-content/uploads/2021/04/CO21064.pdf, accessed 19 October 2021; Italo Colantone and Piero Stanig, 'Globalisation and economic nationalism', *VoxEU*, 20 February 2017, at https://voxeu.org/article/globalisation-and-economic-nationalism, accessed 19 October 2021; Razeen Sally, 'Trade, deglobalisation and the new mercantilism', *East Asia Forum*, 11 July 2020, at https://www.eastasiaforum.org/2020/07/11/trade-deglobalisation-and-the-new-mercantilism/, accessed 19 October 2021; and Douglas Irwin, 'The pandemic adds momentum to the deglobalisation trend', *VoxEU*, 5 May 2020, at https://voxeu.org/article/pandemic-adds-momentum-deglobalisation-trend, accessed 19 October 2021.

First World War (1914-1918).[14] In the 1920s, governments tried to rebuild the pre-war international economy, but their efforts were short-lived. In the 1930s, global depression and economic nationalism plunged the world into a period of economic de-globalisation. Governments expanded the deployment of protectionist devices in trade and finance; the world splintered into separate trade and monetary blocs. After the Second World War (1939-1945), the governments of the major economies pursued the partial re-globalisation of the world economy. At the Bretton Woods conference (1944) and in the postwar period, they constructed new global economic institutions – the International Monetary Fund (IMF), the International Bank for Reconstruction and Development (IBRD – the 'World Bank'), the General Agreement on Tariffs and Trade (GATT) – to foster international cooperation in trade and monetary affairs.[15] They also pursued freer trade in goods, albeit very cautiously, but specifically rejected financial globalisation (i.e. they rejected the principle of free cross-border capital movements) and endorsed the use of capital controls (i.e. rules and devices that controlled and limited cross-border capital movements)[16] This is why we can only characterise the 're-globalisation' that took place in the three decades or so that followed the end of the Second World War as partial re-globalisation. In the arena of international finance and investment, the world of the 'first globalisation' was more globalised than the world of the 1940s to the 1970s.[17] Financial globalisation would only

[14] Thomas Piketty, *Capital in the Twenty-First Century*, trans. Arthur Goldhammer (Cambridge, MA, 2014), p. 28.

[15] This brief historical summary draws on Harold James, *International Monetary Cooperation* (Washington, DC, 1996), pp. 18-53 and Francine McKenzie, *GATT and Global Order in the Postwar Era* (Cambridge, 2020), ch. 1.

[16] Eric Helleiner, *States and the Reemergence of Global Finance: From Bretton Woods to the 1990s* (Ithaca, NY, 1994), ch. 2; and John G. Ruggie, 'International Regimes, Transactions, and Change: Embedded Liberalism in the Postwar Economic Order', *International Organization*,36 (1982), pp. 396-397.

[17] Maurice Obstfeld and Alan M. Taylor, *Global Capital Markets: Integration, Crisis, and Growth* (Cambridge, 2004), pp. 55-57; and Livesey, *From Global to Local*, pp. 10-11.

gradually re-emerge in the 1960s before picking up pace in the 1970s and 1980s.[18] Today, it is easier for individuals/firms to borrow/lend from/to foreign individuals/firms or to invest overseas and attract foreign investment than it was in the immediate decades following the end of the Second World War.

Finally, scholars and commentators tend to speak of another vigorous age of globalisation that roughly spans the 1980s/1990s and the global financial crisis of 2007-2008.[19] This more recent period of globalisation is intertwined with the rise of information and communications technology (ICT).[20]

As the brief chronological sketch above shows, globalisation is neither 'irreversible' nor 'inevitable'. This is because the decision to embrace or reject globalisation is a political one.[21] We decide how much globalisation we are willing to tolerate. The emergence of new technologies that reduce transportation/communications costs and eliminate distance does not automatically lead to 'more' globalisation.[22] In any society, globalisation creates 'winners and losers'.[23] Cheap imported goods may be viewed by local workers and local farmers as a threat to their livelihoods.[24] Locals may begin to resent migrant labour for 'stealing jobs'.[25] The public and the political class may accuse large transnational

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[18] Helleiner, *States and the Reemergence of Global Finance*, chs 4-7; and Obstfeld and Taylor, *Global Capital Markets*, pp. 27-28.

[19] See, for example, 'Slowbalisation', *The Economist*, 26 January 2019, p. 11, at https://www.proquest.com/docview/2171135679?accountid=196406&pq-origsite=primo, accessed 19 October 2019; and Stenger, *Globalization*, pp. 19 and 36.

[20] Stenger, *Globalization*, p. 36; and Baldwin, *The Great Convergence*, pp. 130-132.

[21] Kevin O'Rourke and Ronald Findlay, 'Lessons from the history of trade and war', *VoxEU*, 10 March 2008, at https://voxeu.org/article/lessons-1000-years-trade-history, accessed 19 October 2021.

[22] Ibid.

[23] Ibid.

[24] Ibid. See, also, Colantone and Stanig, 'Globalisation and economic nationalism'.

[25] See, for example, Choo Yun Ting, 'Parliament: Chan Chun Sing addresses fears over foreign talent, telling S'poreans "this Govt will always have your back"', *The Straits Times*, 6 January 2020,

corporations that invest heavily overseas instead of in their home country of exporting jobs.[26] In many societies, there is nothing to prevent the 'losers' of globalisation from using their political influence to enact policies aimed at limiting the country's economic openness (e.g. higher tariffs on imports, restrictions on immigration, and controls on cross-border capital movements).[27]

The 'winners' and the supporters of globalisation will, of course, constantly reiterate the case for globalisation. Economists will point out that trade promotes international specialisation and the efficient allocation of resources.[28] Pro-globalisation voices may extol large foreign markets and warn that economic stagnation would follow in the wake of protectionism.[29] Businesses may argue that cheap imported inputs and skilled foreign labour are vital for maintaining their competitiveness.[30] Transnational corporations may contend that they need to invest overseas in order to gain access to foreign markets or to pools of skilled workers that cannot be found in their home countries.[31] Politicians and

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at https://www.straitstimes.com/politics/parliament-chan-chun-sing-allays-fears-about-foreigners-in-workforce-telling-sporeans-this, accessed 19 October 2021.

[26] Daniel W. Drezner, 'The Outsourcing Bogeyman', *Foreign Affairs*, May/June 2004, pp. 22-23.

[27] O'Rourke and Findlay, 'Lessons from the history of trade and war'.

[28] Douglas Irwin, 'The Truth About Trade: What Critics Get Wrong About the Global Economy', *Foreign Affairs*, July/August 2016, p. 85.

[29] See, for example, Tang See Kit, 'Free trade agreements are critical to Singapore's economic survival, says Ong Ye Kung', *CNA*, 6 July 2021, at https://www.channelnewsasia.com/business/parliament-free-trade-agreements-critical-survival-ong-ye-kung-1990426, accessed 19 October 2021; and Scott Lincicome, 'The Case for Free Trade', *Cato Institute*, 2 May 2019, at https://www.cato.org/commentary/case-free-trade, accessed 19 October 2021.

[30] See, for example, Rajesh Kumar Singh, 'Trump steel tariffs bring job losses to swing state Michigan', *Reuters*, 9 October 2020, at https://www.reuters.com/article/us-usa-election-steel-insight-idUSKBN26U161, accessed 19 October 2021; and Joe Devanesan, 'Singapore needs foreign talent to fill its gaping technology jobs gap', *Techwire Asia*, 20 May 2021, at https://techwireasia.com/2021/05/singapore-needs-foreign-talent-to-fill-its-gaping-technology-jobs-gap/, accessed 19 October 2021.

[31] See, for example, U.S. Chamber of Commerce, 'The Benefits of International Investment', at https://www.uschamber.com/report/benefits-international-investment, accessed

intellectuals may praise the moral benefits of globalisation. Since the nineteenth century, the supporters of free trade have loudly stressed the link between economic openness and world peace.[32] It was also common, in the 1990s and the early years of the twenty-first century, for political leaders from the United States to praise globalisation as a force for ushering in global democracy.[33] Finally, political leaders have often viewed international trade pacts/agreements as tools for building diplomatic alliances.[34]

But there is no guarantee that the supporters of globalisation will always be able to dominate the political and policy agenda at the expense of the 'losers'. The contest between the 'winners' and 'losers' of globalisation demonstrate a crucial fact: domestic socio-economic goals (e.g. full employment) are often in conflict with external economic goals (e.g. freer trade and free cross-border capital movements).[35] We saw earlier that governments only pursued partial re-globalisation after the Second World War. This was

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19 October 2021; and Glenn Leibowitz, 'Apple CEO Tim Cook: This is the number one reason we make iPhones in China', *LinkedIn*, 21 December 2017, at https://www.linkedin.com/pulse/apple-ceo-tim-cook-number-one-reason-we-make-iphones-china-leibowitz/?src=aff-lilpar&veh=aff_src.aff-lilpar_c.partners_pkw.10078_plc.Skimbit%20Ltd._pcrid.449670_learning&trk=aff_src.aff-lilpar_c.partners_pkw.10078_plc.Skimbit%20Ltd._pcrid.449670_learning&clickid=UzZXOuz2-xyIRTvx-IUk53XqUkBSmA0JY072SE0&mcid=6851962469594763264&irgwc=1, accessed 19 October 2019.

[32] Thomas E. Woods, Jr, 'Cobden on Freedom, Peace, and Trade', *Mises Institute*, 2 October 2017, at https://mises.org/library/cobden-freedom-peace-and-trade, accessed 19 October 2021. See, also, 'Globalisation can't be stopped; if trade halts, war will follow: Jack Ma', 24 January 2018.

[33] Douglas Irwin, *Clashing Over Commerce: A History of US Trade Policy* (Chicago, IL, 2017), p. 632; and Douglas Irwin, *Free Trade Under Fire, 4th edition* (Princeton, NJ, 2015), p. 62.

[34] Greg Mastel, 'The Rise of the Free Trade Agreement', *Challenge*, 47(2004), pp. 46-48. See, also, McKenzie, *GATT and Global Order*, chs 2-3.

[35] For an illustration of these tensions, see Martin Daunton, *Wealth and Welfare: An Economic and Social History of Britain, 1851-1951* (Oxford, 2007), pp. 299-306; and Jeffry Frieden, 'The Political Economy of the Bretton Woods Agreements', in Naomi Lamoreaux and Ian Shapiro (eds), *The Bretton Woods Agreements: Together with Scholarly Commentaries and Essential Historical Documents* (New Haven, CT, 2019), pp. 23-27.

because they were trying to protect their ambitious domestic socio-economic goals (e.g. full employment and the expansion of social welfare programmes). They believed that the principle of free cross-border capital movements would harm the pursuit of these domestic goals. Accordingly, they rejected financial globalisation.[36] By the 1970s, however, the emergence of 'neoliberal' economic attitudes would facilitate the return of financial globalisation. Simply put, 'neoliberals' championed 'laissez-faire' economic ideas - i.e. the argument that we should not interfere with the operation of so-called 'natural' market forces – and were less interested in protecting domestic social programmes. These new economic attitudes paved the way for the removal of controls on cross-border capital movements.[37] Thus, we can see that globalisation is not an irresistible force brought about by technological change. Instead, the decision to accept or reject globalisation is rooted in political calculations and shifting economic ideologies.

Watch

'Downsides to open economy must be attended to: Lawrence Wong', *The Straits Times*, published on 14 September 2021, at https://www.youtube.com/watch?v=EiK24R9mrnw, accessed 18 October 2021.

[36] Helleiner, *States and the Reemergence of Global Finance*, pp. 33-35; and Eric Helleiner, 'National Inequalities and the Political Economy of Global Financial Reform', in José Antonio Ocampo (ed.), *International Policy Rules and Inequality: Implications for Global Economic Governance* (New York, 2019), p. 35.

[37] Helleiner, *States and the Reemergence of Global Finance*, pp. 15 and 110-120; and Stenger, *Globalization*, p. 41.

Read

Tang See Kit, 'Free trade agreements are critical to Singapore's economic survival, says Ong Ye Kung', *CNA*, 6 July 2021, at https://www.channelnewsasia.com/business/parliament-free-trade-agreements-critical-survival-ong-ye-kung-1990426, accessed 18 October 2021.

Activity 1.1

Globalisation and Technology: The View from Singapore

Watch/read the video/article above – 'Downsides to open economy must be attended to: Lawrence Wong' and 'Free trade agreements are critical to Singapore's economic survival, says Ong Ye Kung' – and answer the following question:

Who are the 'winners' and the 'losers' of globalisation in Singapore?

1.2 What is technology?

The meanings and connotations of words are not static. The term 'technology' is no exception to this rule. The meaning (or meanings, rather) of the term 'technology' has changed in the past and will probably continue to change in the future. At the time of writing, the term 'technology' is often casually conflated in media discourse with information technology.[38] But who is to say that this will remain the case in several decades' time? Words are not static. Our ability to imagine alternative technological futures will be greatly enhanced if we become conscious of this fact.

[38] David E. Nye, *Technology Matters: Questions to Live With* (Cambridge, MA, 2006), p. 15.

In this section, we will briefly look at the evolution of the term 'technology'. We will pay particular attention to a few of the more common meanings and connotations of 'technology' in contemporary discussions.

The term 'technology' appeared in the English language for the first time in the seventeenth century.[39] But, back then, as Leo Marx explains, 'a *technology* was a branch of learning, or discourse, or treatise concerned with the mechanic arts.'[40] Moreover, the word 'technology' was not commonly used in the United States during the nineteenth century.[41] In the United States, it was not until the start of the twentieth century that 'technology' began to assume the more recognisable meaning of 'the mechanic arts collectively'.[42] However, usage of the term would only become more widespread by the 1930s.[43]

According to David E. Nye, the term 'technology' would eventually come, by the mid-twentieth century, to refer broadly to sophisticated complexes of machines and methods.[44] Thereafter, the meaning of the term continued to stay volatile.[45] During the 1990s, as briefly mentioned above, the media began to equate 'technology' with information technology.

Apart from information technology and digital technologies, what are some of the common connotations of technology in our present age? What are the activities, priorities, images, and narratives that instinctively come to mind when the word 'technology' is mentioned?

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[39] Leo Marx, 'Technology: The Emergence of a Hazardous Concept', *Technology and Culture*, 51(2010), p. 562.

[40] Ibid. Emphasis supplied.

[41] Ibid.

[42] Ibid.

[43] Ibid.

[44] Nye, *Technology Matters*, p. 15.

[45] Ibid.

1.2.1 Is technology 'applied science'?

Technology is often thought of in our present age as 'applied science'.[46] But, as we shall see, the alliance between science and technology was only established in the nineteenth and twentieth centuries. What are the differences between science and technology? Scientific understanding, according to James McClellan and Harold Dorn, arises from 'abstract understanding of a phenomenon'.[47] This, however, should be distinguished from '[p]ractical knowledge embodied in the crafts'.[48]

McClellan and Dorn show that the work of 'technological practitioners' and the pursuit of scientific knowledge largely took place in separate spheres of activity before the nineteenth century.[49] The practitioners were mainly – to use a modern turn-of-phrase – uneducated. They acquired their skills through practical training; scientific theory did not figure heavily in their work.[50] Among the members of this class of practitioners were Thomas Newcomen (1664-1729) and James Watt (1736-1819), the industrial pioneers behind the steam engine.[51]

The construction of sturdy bridges between science and technology only took place in the nineteenth and twentieth centuries. Businesses and governments alike began to appreciate the benefits of channelling scientific research and theory into technological pursuits.[52] This shift was manifested in the emergence of the 'industrial research laboratory' during the late-nineteenth century.[53] But it was the rise of massive state funding for 'pure and

[46] James E. McClellan III and Harold Dorn, *Science and Technology in World History: An Introduction, 3rd edition* (Baltimore, MD, 2015), p. 7.

[47] Ibid., p. 28.

[48] Ibid.

[49] Ibid., pp. 6 and 8-9.

[50] Ibid., p. 6.

[51] Ibid., p. 309.

[52] Ibid., pp. 427-428.

[53] Ibid., p. 347.

applied science' during the Second World War and the Cold War that solidified the public perception of 'technology' as 'applied science'.[54]

Why is it important to understand the background of the term 'applied science'? The term 'applied science' implies that formal scientific understanding necessarily precedes technological achievement. But, as the example of the steam engine shows, this was not how new technologies emerged in the past. Indeed, Nye points out that the historical record shows that technology usually preceded science. In other words, theoretical understanding followed practical achievement.[55]

A correct understanding of the relationship between 'science' and 'technology' will help us to expand our imagination. The belief that science necessarily precedes technology will lead us to define a particular set of policy, business, and educational choices. But this set of choices and possibilities will be enriched and enlarged if we understand that technology has often preceded science. It is clear, for example, that the recognition that 'technology came first' may impinge on discussions of the comparative benefits of subsidising more industrial apprenticeships or more STEM (science, technology, mathematics, and engineering) doctoral students.

1.2.2 Is technology 'innovation'?

'Technological innovation' is highly esteemed in our contemporary world.[56] But, as Benoît Godin reminds us, historically, the term 'innovation' was used to describe deviant behaviour.[57] The 'innovator' was an individual or a group that was perceived to be engaging in undesirable political, religious, or ideological experimentation.[58] How, then,

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[54] Ibid., p. 430.

[55] Nye, *Technology Matters*, p. 9.

[56] Benoît Godin, 'Technological Innovation: On the Origins and Development of an Inclusive Concept', *Technology and Culture*, 57(2016), p. 527.

[57] Ibid.

[58] Ibid., p. 528.

did 'innovation' evolve into the term of praise that it is today?[59] Godin notes that the full-blown reinvention of 'innovation' as a positive term can be dated to the post-Second World War period, when it was identified as a pathway to economic vigour.[60]

Modern-day innovation-worship, however, may blind us to important facts and trends. We hold technological innovation in high regard. But are we actually carrying out a great deal more innovation than our predecessors? 'In recent years', Lee Vinsel and Andrew L. Russell point out, 'economists have noted that the rate of innovation has decreased since about 1970.'[61]

Innovation-worship also privileges 'newness' at the expense of old technologies. As David Edgerton shows, this may blind us to the fact that 'old' technologies often remain heavily in use alongside newer ones.[62] This can clearly be seen in the realm of military technology, where decades-old Cold War-era weapons platform are still being deployed in conjunction with newer systems. The United States Air Force, for example, expects the venerable B-52 bomber, which was introduced in the 1950s, to remain a key component of its inventory until 2050.[63] The continued relevance of many 'old' technologies flies in the face of popular linear narratives of technological change. These narratives posit linear stages of technological change – e.g. the first, second, third, and fourth industrial revolutions – with a new set of 'blockbuster' technologies acting as the centrepiece of each stage.[64] We are, according to Klaus Schwab, executive chairman of the World Economic Forum, living in the midst of a 'Fourth Industrial Revolution', a new technological phase characterised

[59] Ibid., p. 527.

[60] Ibid., p. 549.

[61] Lee Vinsel and Andrew L. Russell, *The Innovation Delusion: How Our Obsession with the New Has Disrupted the Work that Matters Most* (New York, 2020), p. 13.

[62] David Edgerton, *The Shock of the Old: Technology and Global History since 1900* (London, 2008).

[63] Michael R. Gordon, 'For Wars of the Future, Pentagon Looks to Distant Past: The B-52', *The Wall Street Journal*, 24 January 2021, at https://www.wsj.com/articles/for-wars-of-the-future-pentagon-looks-to-distant-past-the-b-52-11611510806, accessed 20 October 2021.

[64] See, for example, Klaus Schwab, *The Fourth Industrial Revolution* (New York, 2016), pp. 6-8.

by the 'digitization of manufacturing'.[65] At the same time, we are also being told that the 'old' bicycle will help us to combat climate change.[66]

Finally, innovation-worship may lead us to neglect the importance of the unflashy task of maintenance. As Vinsel and Russell have stressed, 'technology is not innovation.'[67] Innovation, they explain, is simply a minor aspect of technological change.[68] Shallow innovation chatter, Vinsel and Russell warn, overlooks the centrality of maintenance in our relationship with technology.[69] This view is echoed by David Edgerton. Most scientists and engineers, Edgerton reminds us, have primarily been involved in the wielding and 'maintenance of things' rather than the creation of new ones.[70]

1.2.3 Is technology our master?

As Nye observes, we often casually express technologically deterministic perspectives when discussing technological change.[71] What is technological determinism? The political theorist Langdon Winner describes technological determinism as 'the idea that technology develops as the sole result of an internal dynamic and then, unmediated by any other

[65] Schwab, *The Fourth Industrial Revolution*, pp. 7-8; and Bernard Marr, 'What is Industry 4.0? Here's a Super Easy Explanation For Anyone', *Forbes*, 2 September 2018, at https://www.forbes.com/sites/bernardmarr/2018/09/02/what-is-industry-4-0-heres-a-super-easy-explanation-for-anyone/?sh=65d7411c9788, accessed 20 October 2021.

[66] See, for example, Christian Brand, 'Commentary: Cycling is 10 times more important than electric cars for cities to reach net-zero', *CNA*, 3 April 2021, at https://www.channelnewsasia.com/commentary/cycling-electric-cars-carbon-net-zero-climate-change-1883251, accessed 20 October 2021.

[67] Lee Vinsel and Andrew Russell, 'Hail the maintainers', *Aeon*, 7 April 2016, at https://aeon.co/essays/innovation-is-overvalued-maintenance-often-matters-more, accessed 20 October 2021.

[68] Ibid.

[69] Vinsel and Russell, *The Innovation Delusion*, p. 13.

[70] Edgerton, *The Shock of the Old*, p. xv.

[71] Nye, *Technology Matters*, p. 17.

influence, molds society to fit its patterns.'[72] This definition echoes the characterisation of technology in the writings of the late French philosopher Jacques Ellul. Ellul spoke, not of machines, but of a force called 'technique' – defined as 'the totality of methods rationally arrived at and having absolute efficiency (for a given stage of development) in every field of human activity'[73] – that gains control over mankind.[74] A 'technical civilization' arises from this dynamic. 'Technical civilization', Ellul explained, 'means that our civilization is constructed by technique ... for technique ... and is exclusively technique ...'[75] Notice that in these frameworks, technological change appears as a relentless and 'inevitable' force that determines the shape of society, while we are presented as powerless spectators.[76] Notice, too, that in these frameworks, technology also appears as an independent outside force, with its own inner momentum, that 'collides' with society.[77]

Thus, in a technologically deterministic framework, technology is the master while we are the slaves. Is this truly the case? There is, in fact, plenty of evidence that shows that human beings are the ones who are in control.

1.2.4 Questioning technological determinism

The Amish communities in the United States provide us with a counterpoint to the assertions of technologically deterministic perspectives.[78] From the outside, an Amish community appears to be frozen in the nineteenth-century. It may seem, therefore, that they are opposed to technology. In fact, the truth is that the Amish are willing to accept technology. But, for the Amish, technological adoption is preceded by cautious reflection

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[72] Langdon Winner, *The Whale and the Reactor: A Search for Limits in an Age of High Technology, 2nd edition* (Chicago, IL, 2020), p. 21.

[73] Jacques Ellul, *The Technological Society*, trans. John Wilkinson (New York, 1964), p. xxv.

[74] Ibid., p. 127.

[75] Ibid., p. 128.

[76] Nye, *Technology Matters*, pp. 17-19 and 47; and Winner, *The Whale and the Reactor*, pp. 9-10.

[77] Nye, *Technology Matters*, pp. 47 and 61-62.

[78] Ibid., p. 18.

on the impact of new technologies on the Amish way of life. This involves monitoring the effects of particular technologies on non-Amish communities before making decisions on whether or not they should be adopted.[79]

Before dismissing such behaviour as backward, it is important to note that this attitude echoes the widespread practice of conducting clinical trials and applying for regulatory approval before commercially distributing new drugs. Nye has suggested that this approach, in concert with other measures, can be applied to all new technologies.[80] This is a fascinating approach. Would we have allowed certain digital technologies – e.g. social media and artificial intelligence – to become as pervasive as they are now if we had conducted 'clinical trials' aimed at assessing their impact on our values and institutions?

The Amish approach to technology shows that we have the ability to make considered decisions about technological adoption. We are not powerless spectators in the face of technological change. We can oppose or reject even seemingly indispensable technologies.[81] The mere existence of a particular type of technology does not mean that we will mechanically accept and deploy it.[82] Many examples of *human agency* can be found in the past. Japan, for example, spurned the firearm in the seventeenth century due to, among other factors, 'cultural reasons'.[83] In the first half of the first millennium, as Richard Bulliet has shown, wheeled transportation fell out of use in the Middle East because transport by camel and donkey was cheaper.[84]

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[79] Michael J. Coren, 'The Amish understand a life-changing truth about technology the rest of us don't', *Quartz*, 30 May 2018, at https://qz.com/1275194/the-amish-understand-a-life-changing-truth-about-technology-the-rest-of-us-dont/, accessed 20 October 2021.

[80] Nye, *Technology Matters*, p. 159.

[81] Ibid., p. 18.

[82] Ibid., p. 20.

[83] Ibid., p. 17; and Michael S. Neiberg, *Warfare in World History* (London, 2001), p. 34.

[84] Richard Bulliet, *The Wheel: Inventions and Reinventions* (New York, 2016), pp. 42-43.

Technology is not an inevitable and relentless force to whose will we humans must surrender. Nye suggests instead that technological change is a 'social construction'.[85] This means that technology is 'shaped by its social context.'[86] This is the opposite of the conception of technology as an independent outside force that 'collides' with society.[87] What evidence do we have that shows that technological change is heavily influenced by social context? Nye shows us that the *same* technologies are understood, used, and diffused differently in different contexts (e.g. in different countries).[88] For example, Nye points out that Britain warmed to purchasing food online at a faster pace than the Danes. This was in spite of the fact that a larger proportion of the Danish population was online.[89] In the same way, the consumer response to electrification differed from country to country in the past. In the United States, most urban dwellings had electricity by the 1930s, but in Britain, the working class remained wedded to gas.[90]

1.3 Globlisation and Technology

We now have answers to the dual questions of 'What is globalisation?' and 'What is technology?' Let us now briefly recapitulate the impact of technology on the globalisation cycle.

Globalisation, as explained earlier, refers to the integration of global markets for goods, services, capital, labour, and ideas. Thus, the emergence of new technologies that drive down the costs and increase the ease and speed of moving goods, services, capital, labour, and ideas across different markets may accelerate the integration of global markets for goods, services, capital, labour, and ideas. However, as also discussed earlier,

[85] Nye, *Technology Matters*, p. 64.

[86] Ibid., p. 61.

[87] Ibid., pp. 61-62.

[88] Ibid., pp. 61-65.

[89] Ibid., p. 63.

[90] Ibid., p. 64.

we cannot assume that the appearance of such technologies will automatically trigger the intensification of economic globalisation. This is because the amount of economic openness that a country is willing to accept is also a political and ideological decision.

What are the major technologies that have played a role in shaping modern economic globalisation? Scholars often highlight transport and communications technologies. For example, it is often said that, in the nineteenth century, the steam engine and the telegraph revolutionised transport (land / sea) and communications respectively.[91] But the reduction in transport costs facilitated the export of inexpensive grain from North America and Russia, triggering a protectionist backlash in Continental Europe in the late nineteenth century.[92] Not for the last time, the 'losers' of globalisation – uncompetitive Continental European farmers in this case – mobilised against economic openness in the defence of their economic interests. Moreover, as the economists Kevin O'Rourke and Ronald Findlay have pointed out, in the nineteenth century, the British Royal Navy policed the seas while military conflict between the great powers did not take place often. The implication is the new technologies might not have had such a great impact on globalisation if international political and security conditions had been more volatile.[93] Clearly, the political dimension (a very human dimension, one should add) of globalisation cannot be ignored.

Of course, it is also possible for new technologies to trigger de-globalising trends. The late Finbarr Livesey, for example, argued that technological change in the contemporary world would facilitate and encourage the localisation and regionalisation of production. In other words, technological change would reduce rather than intensify cross-border movements of goods.[94] We will examine Livesey's views more closely in Study Unit 2.

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[91] See, for example, Baldwin, *The Great Convergence*, pp. 49-53.

[92] O'Rourke and Findlay, 'Lessons from the history of trade and war'.

[93] Ibid.

[94] See Livesey (2017).

Watch

'PSA Bicentennial Series Ep 1: The Origins of the Modern Port of Singapore', *PSA Singapore*, published on 29 October 2019, at https://www.youtube.com/watch?v=-2ZDFXIN9nQ, accessed 18 October 2021.

'PSA Bicentennial Series Ep 2: Singapore as a Trading Post in the 1800s', *PSA Singapore*, published on 29 October 2019, at https://www.youtube.com/watch?v=wGz2C1AbzsA, accessed 18 October 2021.

'PSA Bicentennial Series Ep 3: The Rise of the Port of Singapore', *PSA Singapore*, published on 29 October 2019, at https://www.youtube.com/watch?v=gqwG88fywbc, accessed 18 October 2021.

'PSA Bicentennial Series Ep 4: The Dawn of a New Era', *PSA Singapore*, published on 31 January 2020, at https://www.youtube.com/watch?v=j_xRgpNQqeA, accessed 18 October 2021.

'PSA Bicentennial Series Ep 5: Going Global', *PSA Singapore*, published on 1 February 2020, at https://www.youtube.com/watch?v=V7Fv3erV3qQ, accessed 18 October 2021.

Read

HistorySG, 'Arrival of the first P&O Steamship, 4th August 1845', at https://eresources.nlb.gov.sg/history/events/4301f69a-9f16-4a46-894f-0e552dbe11e8, accessed 18 October 2021.

HistorySG, 'Henry Keppel surveys new New Habour, 30th May 1848', at https://eresources.nlb.gov.sg/history/events/6f5184c7-d976-4f15-8da3-a77dab180981, accessed 18 October 2021.

HistorySG, 'Tanjong Pagar Dock Company Limited is Established, 29th September 1864', at https://eresources.nlb.gov.sg/history/events/2aeba080-ec67-4a62-ba93-407840b26d10, accessed 18 October 2021.

HistorySG, 'Opening of the Suez Canal, 17th October 1869', at https://eresources.nlb.gov.sg/history/events/15fcae20-2e3d-4eec-b5ab-2384f1aac2b9, accessed 18 October 2021.

Fabian Koh, 'Tuas Port to be world's largest fully automated terminal when completed in 2040', *The Straits Times*, 4 October 2019, at https://www.straitstimes.com/singapore/tuas-port-to-be-worlds-largest-fully-automated-terminal-when-completed-in-2040-pm-lee, accessed 18 October 2021.

Activity 1.2

Globalisation and Technology: The View from Singapore

As we have seen, globalisation is not solely and automatically driven by technological change. This activity will reinforce your understanding of this theme by getting you to reflect on the past, present, and future of Singapore's role as an international maritime centre.

Watch/read the videos/articles above – the PSA Bicentennial Series, the HistorySG articles, and the ST article on Tuas Port – and answer the following question:

What are the *non-technological* and *technological* factors that have shaped the growth of the maritime interconnections between Singapore and the rest of the world?

Chapter 2: The Diffusion of Technology across Time and Space

2.1 Economic ideology and the role of the state

In this chapter, we will examine the respective roles of the state and private economic agents in driving technological change, adoption, and diffusion. Let us begin with the state.

Technological change is, quite naturally, heavily intertwined with the general economic environment. The roots of technological change must therefore be partially located in the dominant economic philosophies of the age. For example, early interpretations of the origins of the industrial revolution stressed the emergence of 'laissez-faire' ideas that resulted in the elimination of certain practices that had acted as barriers to technological change.[95] This is not to suggest that state regulation and intervention will always impede technological improvement. As we saw earlier, governments began to fund scientific research on a massive scale during the Second World War and the Cold War. The truth is that most governments today are not in favour of taking a completely 'laissez-faire' approach in the pursuit of technological and industrial strength.[96] But the perception of the ideal balance between state intervention and the free market is still a subject of ceaseless debate.[97]

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[95] Peter N. Stearns, *Debating the Industrial Revolution* (London, 2015), pp. 37-38.

[96] See, for example, Dani Rodrik, 'The Return of Industrial Policy', *Project Syndicate*, 12 April 2010, at https://www.project-syndicate.org/commentary/the-return-of-industrial-policy-2010-04, accessed 20 October 2021.

[97] Mariana Mazzucato, for example, has argued that the state should play a leading role in promoting innovation. See Mariana Mazzucato, *The Entrepreneurial State: Debunking Public vs Private Sector Myths* (London, 2018). For a critique of Mazzucato's views, and a pro-market perspective, see Alberto Mingardi, 'A Critique of Mazzucato's Entrepreneurial State', *Cato Journal*, 35(2015), pp. 603-625.

According to David Edgerton, the bulk of technological change 'is taking place by the transfer of techniques from place to place.'[98] We see this very prominently in the phenomenon known as economic and technological 'catch up', or the closing of the economic and technological gap between developing nations and their more advanced counterparts. Scholars have observed that countries (so-called 'late industrialisers') aiming to catch up with technologically and economically advanced nations often rely heavily on state intervention.[99] These interventionist methods and strategies may include (but is not limited to) the following: infant industry protection, import substitution industrialisation, strict regulation of international capital movements, direct state provision of infrastructure, direct state provision of finance, state ownership of certain industries, the provision of subsidies for companies, and conscious efforts on the part of the state to pick the industries that should be cultivated and expanded.[100]

In contrast, intellectuals and policymakers who are less enamoured of the alleged benefits of state intervention may prescribe liberalising measures and a smaller role for the state for countries pursuing economic and technological catch-up. This could include, among other policies, the pursuit of free trade, freedom of capital movements, and the privatisation of state-owned businesses.[101] The policy choices made will impinge on the course of globalisation. Nations that are committed to different strategies for pursuing technological strength may also clash in the arena of international trade. Finally, it should also be noted

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[98] Edgerton, *The Shock of the Old*, p. 209.

[99] Stearns, *Debating the Industrial Revolution*, pp. 31, 112-115, 118-119, and 129-130.

[100] For further reflection on or examples of the real-world deployment of these methods, see Frieden, *Global Capitalism*, pp. 303-307; Stearns, *Debating the Industrial Revolution*, pp. 118-119; Peter N. Stearns, *The Industrial Revolution in World History*, 5th edition (New York, 2021), pp. 60-61, 118-119, and 134; and Ha-Joon Chang, *Bad Samaritans: The Guilty Secrets of Rich Nations and the Threat to Global Prosperity* (London, 2007), pp. 14, 58-60, 82-96, and 108-116.

[101] Chang, *Bad Samaritans*, pp. 67-69, 85-86, and 103-106.

that governments may resort to outright theft and industrial espionage in their pursuit of technological might.[102]

The two approaches illustrated above are linked to different bodies of economic thought. Supporters of infant industry protection may, for example, be inspired by the ideas of the nineteenth-century economist Friedrich List or the development economist Ha-Joon Chang.[103] Those who believe in liberalising measures may be inspired by 'neoliberal' ideas (see 1.1.2 for a recap of the meaning of this term).[104] The key point to note is that state policy is one of the major factors that shapes both the technological destiny of a country and the international diffusion of technology. But this leads us to another question: What does the state expect to gain from technology?

2.1.1 The motivations of the state

In this section, we will critically examine two key motivations that drive the state's quest for technological strength and improvement: national defence and economic growth.

Many governments would contend that technological might leads to military might.[105] While this may seem intuitive, it is important to note that technologically 'superior' nations do not always triumph over technologically 'inferior' adversaries.[106] At the

[102] See, for example, Robert Farley, 'Why China's Technology Theft Poses a Bigger Challenge Than That of the Soviet Union', *The Diplomat*, 13 May 2020, at https://thediplomat.com/2020/05/why-chinas-technology-theft-poses-a-bigger-challenge-than-that-of-the-soviet-union/, accessed 20 October 2021.

[103] See Chang (2007). For brief summaries of the views of Friedrich List, see Chang, *Bad Samaritans*, pp. 16 and 50.

[104] For another explanation of neoliberalism, see Chang, *Bad Samaritans*, pp. 12-13.

[105] Steven L. Canby, 'The Quest for Technological Superiority – A Misunderstanding of War?', *The Adelphi Papers*, 29(1989), p. 26.

[106] Edgerton, *The Shock of the Old*, pp. 150-153.

time of writing, the Taliban have returned to power in Afghanistan.[107] Not for the first time in history, a technologically advanced great power has failed to achieve its political and military goals in Afghanistan. More generally, 'low-tech' terrorists have also demonstrated the ability to confound the security and surveillance efforts of the well-resourced governments of 'high-tech' nations.[108] Other examples can also be found in history. In the Korean and Vietnam wars, the United States failed to defeat technologically weaker opponents.[109] In the 1980s, the Soviet Union failed to triumph over the 'low-tech' Afghan resistance.[110]

In addition to military strength, it is also often said that there is a direct relationship between a country's economic vigour and the amount of technological innovation that it pursues.[111] However, both the historical record and more contemporary data suggest that there is, in fact, no such direct relationship.[112] This is due to the fact that technologies, regardless of their national point of origin, are often disseminated and deployed on a global basis. It is often not necessary to invent technologies from scratch. One can simply enthusiastically adopt and implement the existing technologies pioneered by foreign nations.[113] As David Edgerton notes, this is far more common than innovating from scratch.[114]

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[107] Adam Serwer, 'What the War in Afghanistan Could Never Do', *The Atlantic*, 5 October 2021, at https://www.theatlantic.com/ideas/archive/2021/10/afghanistan-humiliation/620045/, accessed 20 October 2021.

[108] Corri Zoli, 'Is There Any Defense Against Low-Tech Terror', *Foreign Policy*, 2 October 2017, at https://foreignpolicy.com/2017/10/02/terror-has-gone-low-tech/, accessed 20 October 2021.

[109] Edgerton, *The Shock of the Old*, p. 152.

[110] Ruchi Kumar and Hikmat Noori, "'The victory was so strong": Afghans celebrate Soviet pullout', *Al Jazeera*, 15 February 2019, at https://www.aljazeera.com/news/2019/2/15/the-victory-was-so-strong-afghans-celebrate-soviet-pullout, accessed 20 October 2021.

[111] Edgerton, *The Shock of the Old*, pp. 106-107.

[112] Ibid., pp. 108-110.

[113] Ibid., pp. 110-112.

[114] Ibid., p. 111.

2.2 The market and technological diffusion

We have already seen that governments are able to drive the global diffusion of technologies through interventionist policies aimed at economic and technological catch-up. It need hardly be said that private economic agents (e.g. private inventors, entrepreneurs, corporations, consumers) are also key players in the process of technological change, adoption, and diffusion. The transnational corporation, for example, has long been seen as one of the key agents of international technological diffusion. Host nations, so we are told, will benefit from the infusion of technologies and techniques that naturally accompanies the foreign direct investment (FDI) carried out by transnational corporations.[115] It should also be noted, in keeping with this study unit's criticism of innovation-worship, that businesses very often simply replicate existing technologies rather than create new ones. Indeed, this is the historical norm.[116]

We should, of course, broaden our conception of 'space' when reflecting on the diffusion of technologies. Technological diffusion takes place between *and* within nations (or other polities). Within a particular polity, technological adoption and access may differ according to, among other categories, gender, education level, income, race, cultural preferences, and political status.[117] Indeed, several of these categories are often mentioned in discussions of inequalities in internet access and digital proficiency.[118]

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[115] See, for example, Scott Lincicome, 'In Praise of Foreign Direct Investment – (Almost) All of It', *Cato Institute*, 14 April 2021, at https://www.cato.org/commentary/praise-foreign-direct-investment-almost-all-it, accessed 20 October 2021.

[116] Edgerton, *The Shock of the Old*, p. 209.

[117] For examples, see Edgerton, *The Shock of the Old*, pp. 131-136; and Nye, *Technology Matters*, pp. 77-78 and 126-128.

[118] Nye, *Technology Matters*, pp. 77-78; and Anthea Ong, 'Commentary: Covid-19 has revealed a new disadvantaged group among us – digital outcasts', *CNA*, 2 February 2021, at https://www.channelnewsasia.com/commentary/covid-19-has-revealed-digital-divide-literacy-singapore-933441, accessed 20 October 2021.

As we saw earlier in our examples of the different consumer responses to similar technologies in different countries, consumer behaviour is a major factor that drives technological adoption and diffusion. The crucial point to note, as Nye stresses, is that consumers may utilise new technologies in ways that were not anticipated by their creators. Nye points out that Thomas Edison viewed the phonograph as a work tool and failed to see its consumer applications in 'music and entertainment'.[119] In a similar way, the architects of the internet did not conceive of its present consumer-oriented uses (e.g. e-commerce).[120] This shows that a new technology crafted for a specific purpose or to meet a specific need may, in the course of time, accumulate other purposes or be directed towards other needs. Thus, the consumer's 'imagination' is a key factor that drives technological adoption and diffusion.[121]

Governments, as mentioned earlier, are often motivated by defence and economic concerns in their pursuit of technological strength. But what about private motivations? In addition to basic curiosity and profit, what encourages inventors, businesses, and financiers to risk their time and their capital on new technologies? Scholars have highlighted the role of a conducive institutional environment – e.g. protection of property rights and intellectual property – in encouraging entrepreneurial activities.[122] There is also a long tradition in scholarly commentary of reflecting on the 'cultural' reasons for technological change. Are some cultures simply more receptive/hostile to technological change than others?[123] For example, there are those who have attributed East Asia's ability to close the technological and economic gap with other wealthier nations to 'Confucianism'.[124]This echoes the sociologist Max Weber's famous argument that the emergence of capitalism in the west could be attributed to Protestant Christianity.[125]

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[119] Nye, *Technology Matters*, p. 44.

[120] Ibid., p. 45.

[121] Ibid.

[122] Stearns, *Debating the Industrial Revolution*, pp. 56-57.

[123] Ibid., pp. 70-71 and 128.

[124] Ibid., pp. 115-117, 119, and 127-128.

One key motivation that drives technological adoption in our current digital age is the idea that all of our problems can be solved by 'tech'. Meredith Broussard has termed this attitude 'technochauvinism'.[126] The 'technochauvinist' is unable to recognise that tech solutions are not appropriate for certain situations.[127] A hard-headed focus on our problems may, in fact, lead us in the direction of 'low-tech' or even 'non-tech' solutions. It bears repeating that many 'old' technologies are still useful and thus still in use. As mentioned in the previous chapter, the 'old' bicycle is currently being promoted as a climate-friendly means of transport. In recent years, governments have suggested restoring the use of hack-proof typewriters in order to boost cybersecurity.[128] The United States navy has also resurrected the old art of celestial navigation, a skill that will prove to be useful if high-tech navigation systems are disabled by an enemy attack.[129]

In addition to puncturing the assumptions of technochauvinism, the continued relevance of 'old' and 'low-tech' technologies to our contemporary challenges and problems also shows that we should not view the diffusion of technology over time as a linear process in which the old is always being permanently displaced by the new. In reflecting on the course of technological change, it is important also to focus, as David Edgerton has stressed, on the technologies that are actually being used, regardless of their age.[130]

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[125] Ibid., pp. 70-71.

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Activity 1.3

Globalisation and Technology: The View from Singapore

As shown in Chapter 2 of Study Unit 1, government policy plays a major role in driving and shaping the national adoption and international diffusion of technologies. For example, we looked at the policies that governments have traditionally relied on to pursue technological catch-up. This activity will strengthen your understanding of this theme by getting you to reflect on the policies that the Singapore government has traditionally used to pursue technological strength.

Watch/read the videos/articles above and answer the following questions:

a. What policies did the Singapore government use to close the technological gap with advanced economies when Singapore was still a developing country? Would you characterise these policies as interventionist or laissez-faire?

b. What policies is the Singapore government currently using to facilitate/shape the local adoption of new technologies and to promote local technological innovation? Would you characterise these policies as interventionist or laissez-faire?

Summary

This study unit has discussed three central issues (as well as other related questions):

a. What is globalisation?
b. What is technology?
c. and what is the relationship between technology and globalisation?

What is globalisation? As an economic phenomenon, globalisation refers to the integration of global markets for goods, services, capital, labour and ideas. Globalisation is not a new phenomenon, though scholars disagree as to precisely how old it is. Globalisation is also not 'irreversible' and 'inevitable'. This is because the decision to embrace economic openness is a political one. Globalisation creates 'winners' and 'losers' in every nation. As we have seen, the 'losers' may be able to use their political influence to shift their country towards protectionism and economic nationalism.

What is technology? The meaning of the term 'technology' has shifted over time and will in all likelihood continue to do so in the future. In our present age, technology is often thought of as 'applied science' and is linked tightly with 'innovation'. Technologically deterministic perspectives are also commonly expressed in today's world. We questioned these common connotations of technology in this Study Unit. We saw that it is not entirely accurate to describe technology as 'applied science'. This is because, historically, technology often preceded science and not the other way around. We also saw that technology should not be equated with innovation. Finally, we examined the flaws of technologically deterministic perspectives in this Study Unit. We saw evidence that demonstrates that humans are in control of technology and not the other way around. We also saw that technological change is driven by social context.

What is the basic relationship between globalisation and technology? Technological change may accelerate the integration of global markets for goods, services, capital, labour, and ideas if it drives down the costs of moving goods, services, capital, labour, and ideas across different markets. But, as we have seen, the emergence of such technological

developments will not automatically create more globalisation. This is because nations can choose, for political and ideological reasons, to reject economic openness.

Finally, we also examined the factors that drive technological change, adoption, and diffusion in this study unit. We saw that state policies that are aimed at achieving technological catch-up are among the key drivers of technological diffusion. These policies may be interventionist or laissez-faire in nature. We also saw that transnational corporations are major vehicles of international technological diffusion. Consumers, too, play an important role in shaping the adoption and diffusion of new technologies. Very often, consumers end up using new technologies in ways that were not anticipated by their creators. We also tackled the question of what encourages inventors and businessmen to risk their time and their capital on new technologies. We highlighted the importance of a conducive institutional environment and noted that many scholars have also sought to identify the 'cultural' reasons for technological change. Finally, we identified technochauvinism as one of the factors that drives technological adoption in the modern world.

In chapter 2, we also stressed the importance of broadening our conception of time and space when analysing the course of technological change, adoption, and diffusion. In addition to cross-border diffusion, we also need to pay attention to trends in intra-nation diffusion. We must also be wary of linear narratives of technological change that give us the impression that new technologies are constantly displacing old technologies. The truth is that many old technologies remain in use because they continue to provide solutions to our problems.

Formative Assessment

1. Globalisation refers to the integration of global markets for physical goods only.
    a. True.
    b. False.

2. A country that is operating according to autarkic economic principles will _____.
    a. pursue an export-oriented growth strategy.
    b. embrace freedom of capital movements.
    c. heavily reduce its trade barriers.
    d. impose strong protectionist measures in order to cut off imports.

3. Which of the following arguments may be used to show that globalisation is not 'inevitable' and 'irreversible'?
    a. Globalisation only creates domestic 'losers' – e.g. workers whose jobs are threatened by imports – and is therefore vulnerable to domestic political backlashes.
    b. The benefits of globalisation are entirely political in nature (e.g. the use of free trade agreements to strengthen diplomatic partnerships) and will do little to improve the economic well-being of the average citizen. Globalisation is thus vulnerable to domestic political backlashes.
    c. Globalisation creates both domestic 'losers' – e.g. workers whose jobs are threatened by imports – and domestic 'winners' – e.g. businesses that rely on imported inputs. If the 'losers' are able to seize the political/policy agenda from the 'winners', they may be able to effect policy changes that could turn the country inwards economically.
    d. The expansion of immigration is the main effect of globalisation. This will lead to competition with locals over jobs, thus triggering a domestic political backlash against globalisation.

4. Which of the following statements is an accurate description of the approach that governments took towards globalisation in the three decades or so after the Second World War?
    a. Governments believed that financial globalisation should take precedence over other free trade in physical goods.
    b. Governments believed that it was necessary to impose limits on globalisation in order to protect their domestic socio-economic goals.
    c. Governments believed that domestic socio-economic goals should be sacrificed in the name of globalisation.
    d. Governments adopted a laissez-faire approach towards globalisation (i.e. they believed that there should be no government interference whatsoever with international flows of goods, labour, and capital).

5. New technologies will always be rapidly adopted by all countries and communities.
    a. True.
    b. False.

6. Which of the following statements describes a technologically deterministic perspective?
    a. Technological change will reshape society in its image and there is nothing that we can do about it.
    b. Humans control machines, not the other way around.
    c. We have the power to reject the technologies that may pose a threat to our values and institutions.
    d. Technology is heavily influenced by social context.

7. According to Study Unit 1, what are the factors that may determine whether or not a particular technology will be adopted?
    i. Cultural attitudes and preferences

ii. Price

iii. Consumer needs and preferences

iv. All of the above.

a. Option i

b. Option i and ii

c. Option ii and iii

d. Option iv

8. Technologically advanced nations will always defeat technologically weaker opponents in war.

a. True.

b. False.

9. Which of the following policies are likely to be rejected by a government that believes in a laissez-faire approach towards the pursuit of technological improvement?

i. Import substitution industrialization

ii. Infant industry protection

iii. State ownership of crucial industries

iv. All of the above.

a. Option i

b. Option i and iii

c. Option ii and iii

d. Option iv

10. High-tech solutions are always superior to 'low-tech' or 'non-tech' solutions.

a. True.

b. False.

Solutions or Suggested Answers

Formative Assessment

1. Globalisation refers to the integration of global markets for physical goods only.

    a. True.

    Incorrect. This definition of globalisation is too narrow.

    b. False.

    Correct. Globalisation refers to the integration of global markets for goods, services, capital, labour, and ideas.

2. A country that is operating according to autarkic economic principles will _____.

    a. pursue an export-oriented growth strategy.

    Incorrect. This approach will deepen the country's integration with global markets, which is the very opposite of the goals of an autarkic nation.

    b. embrace freedom of capital movements.

    Incorrect. This policy will increase the country's integration with international capital markets, which is the very opposite of the goals of an autarkic nation.

    c. heavily reduce its trade barriers.

    Incorrect. This will encourage imports and thus deepen the country's integration with global markets, which is the very opposite of the goals of an autarkic nation.

    d. impose strong protectionist measures in order to cut off imports.

Correct. An autarkic country will aim to reduce all forms of economic exchange with foreign countries and will choose to rely mainly on its domestic resources for its economic needs.

3. Which of the following arguments may be used to show that globalisation is not 'inevitable' and 'irreversible'?

   a. Globalisation only creates domestic 'losers' – e.g. workers whose jobs are threatened by imports – and is therefore vulnerable to domestic political backlashes.

      Incorrect. Globalisation creates both domestic 'losers' and 'winners' – e.g. groups that may benefit from globalisation. Who is to say that the 'winners' will not dominate the policy agenda?

   b. The benefits of globalisation are entirely political in nature (e.g. the use of free trade agreements to strengthen diplomatic partnerships) and will do little to improve the economic well-being of the average citizen. Globalisation is thus vulnerable to domestic political backlashes.

      Incorrect. As section 1.1.2 of Study Unit 1 shows, globalisation also leads to economic and, in the view of certain circles, moral benefits.

   c. Globalisation creates both domestic 'losers' – e.g. workers whose jobs are threatened by imports – and domestic 'winners' – e.g. businesses that rely on imported inputs. If the 'losers' are able to seize the political/policy agenda from the 'winners', they may be able to effect policy changes that could turn the country inwards economically.

      Correct. Globalisation creates 'winners' and 'losers'. There is no guarantee that the winners will always dominate the political/policy agenda. The 'losers' may be able to seize the political driving seat and turn the country inwards.

d. The expansion of immigration is the main effect of globalisation. This will lead to competition with locals over jobs, thus triggering a domestic political backlash against globalisation.

Incorrect. It is incorrect to claim that the expansion of immigration is the main effect of globalisation. Globalisation refers to the integration of global markets of goods, services, capital, labour, and ideas. Thus, a nation that embraces globalisation will have to open its doors to imports of people, goods, services, capital, and ideas.

4. Which of the following statements is an accurate description of the approach that governments took towards globalisation in the three decades or so after the Second World War?

a. Governments believed that financial globalisation should take precedence over other free trade in physical goods.

Incorrect. In the three decades or so after the Second World War, governments rejected the principle of free cross-border capital movements but pursued freer trade in goods.

b. Governments believed that it was necessary to impose limits on globalisation in order to protect their domestic socio-economic goals.

Correct. In the three decades or so after the Second World War, governments rejected the principle of free cross-border capital movements in order to protect their domestic socio-economic goals (e.g. full employment and the expansion of social welfare programmes).

c. Governments believed that domestic socio-economic goals should be sacrificed in the name of globalisation.

Incorrect. In the three decades or so after the Second World War, governments were willing to impose limits on globalisation in order to protect domestic socio-economic goals.

d. Governments adopted a laissez-faire approach towards globalisation (i.e. they believed that there should be no government interference whatsoever with international flows of goods, labour, and capital).

Incorrect. In the three decades or so after the Second World War, governments rejected the principle of free cross-border capital movements and endorsed the use of capital controls.

5. New technologies will always be rapidly adopted by all countries and communities.

a. True.

Incorrect. There are many examples from the past and the present – e.g. the Amish communities – that show that we can make a calculated and deliberate effort to reject new or commonly used technologies.

b. False.

Correct. There are many examples from the past and the present – e.g. the Amish communities – that show that we can make a calculated and deliberate effort to reject new or commonly used technologies.

6. Which of the following statements describes a technologically deterministic perspective?

a. Technological change will reshape society in its image and there is nothing that we can do about it.

Correct. Technological determinism is the view that technology shapes society according to its requirements and that we are powerless to stop this

process. In a technologically deterministic view of the world, humans are, so to speak, 'controlled' by technology.

b. Humans control machines, not the other way around.

Incorrect. This statement challenges the basic principles of technological determinism.

c. We have the power to reject the technologies that may pose a threat to our values and institutions.

Incorrect. This statement challenges the basic principles of technological determinism by emphasising the role of human agency.

d. Technology is heavily influenced by social context.

Incorrect. This statement challenges the basic principles of technological determinism by emphasising our role in shaping technologies.

7. According to Study Unit 1, what are the factors that may determine whether or not a particular technology will be adopted?

i. Cultural attitudes and preferences
ii. Price
iii. Consumer needs and preferences
iv. All of the above.

a. Option i

Incorrect. All three factors are mentioned in different parts of Study Unit 1.

b. Option i and ii

Incorrect. All three factors are mentioned in different parts of Study Unit 1.

c. Option ii and iii

Incorrect. All three factors are mentioned in different parts of Study Unit 1.

d. Option iv

Correct. The Amish case study shows us how cultural preferences influence technological adoption. The wheel case study shows us that price influences technological adoption. The phonograph and internet examples show us that consumers often adopt new technologies to meet needs and goals that were not anticipated by their creators.

8. Technologically advanced nations will always defeat technologically weaker opponents in war.

a. True.

Incorrect. See the explanation under option b.

b. False.

Correct. History and contemporary case studies show us that technologically advanced nations may sometimes fail to defeat technologically weaker opponents in war.

9. Which of the following policies are likely to be rejected by a government that believes in a laissez-faire approach towards the pursuit of technological improvement?

i. Import substitution industrialization
ii. Infant industry protection
iii. State ownership of crucial industries
iv. All of the above.

a. Option i

Incorrect. See the explanation under d.

b. Option i and iii

Incorrect. See the explanation under d.

c. Option ii and iii

Incorrect. See the explanation under d.

d. Option iv

Correct. All three options are often used by governments that favour a large role for the state in the pursuit of technological improvement. Thus, a government that favours a laissez-faire approach would probably reject all three options.

10. High-tech solutions are always superior to 'low-tech' or 'non-tech' solutions.

a. True.

Incorrect. Please see the explanation under option b.

b. False.

Correct. Study Unit 1 shows us that the ideal solutions to our problems may sometimes be 'low-tech' or 'non-tech' solution.

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Study Unit 2

Globalisation in the Digital Age

Learning Outcomes

By the end of this unit, you should be able to:

1. Explain the impact of the ICT (information and communications technology) revolution on globalisation.
2. Describe the basic differences between physical globalisation and digital globalisation.
3. Discuss how technological change in the digital age may lead to physical de-globalisation.
4. Develop an understanding what it means to be Digital
5. Identify key technological changes during the Digital Age

Overview

Study Unit 2 explores and discusses several implications of globalisation in the specific context of the Digital Age. These can include the movement of people, goods and ideas across borders, the impact of Information and Communication Technologies (ICT) on those movements – particularly in differentiating between physical and digital globalisation, and the impact of digital technologies on the concepts of globalisation and degloblisation. Central to these issues is the evolving roles and responsibilities of the individual living in increasingly diverse and complex local and global communities. Study Unit 2 provides a foundation from which students are encouraged to imagine ways in which the individual can advocate for local and global issues and to effect sustainable change for the betterment of others and society in general.

Lesson Recording

Globalisation in the Digital Age

Chapter 1: The Impact of the Digital Age on Globalisation

1.1 The ICT revolution and globalisation

According to the economist Richard Baldwin, the rise of ICT (information and communications technology) has shaped the course of globalisation from the 1990s to the recent present in a way that differs profoundly from the impact of earlier phases of technological change on the integration of global markets. Baldwin's analysis of the past, present, and future of globalisation is anchored onto the impact of technological change on the costs of moving physical goods, human labour, and ideas across different markets.[1] We will summarise the thrust of Baldwin's argument in this section.

1.1.1 Moving goods across borders

Before the emergence of steam technologies, it was exorbitantly expensive and cumbersome to move physical goods, human labour, and ideas across borders. The sheer difficulties involved in conquering large distances meant that economic activity was concentrated in self-sufficient communities. In other words, there was no market-driven geographical uncoupling of production and consumption. Instead, these two activities had to take place within close range of each other. For example, a village would have to manufacture and cultivate its own necessities for internal use instead of buying and selling such necessities on the global market.[2]

But the emergence of the new transport technologies of the nineteenth-century – steam (and, later, diesel) transport – drove down the costs of moving physical goods across borders. In other words, technological change in the nineteenth century vanquished

[1] This is the central narrative of Richard Baldwin, *The Great Convergence: Information Technology and the New Globalization* (Cambridge, MA, 2016).

[2] Baldwin, *The Great Convergence*, pp. 114-116.

distance as a barrier to the integration of global markets. It was now economically feasible for production and consumption to take place in entirely different geographical zones. Communities were no longer required to be self-sufficient. They could simply purchase necessities and other goods from producers located in distant lands.[3]

However, Baldwin notes that technological change in the nineteenth century did not significantly drive down the costs of moving human labour and ideas across borders. The new communications technologies (the telegraph and the telephone) that were developed and deployed in the nineteenth and early twentieth centuries did not, in Baldwin's view, reduce the difficulties involved in transmitting and communicating sophisticated knowledge across borders.[4] Due to the high costs of moving human labour and ideas across borders, it was simply not economical for firms to disperse their production processes and stages across different geographical zones. All of these processes and stages had to be concentrated within massive manufacturing facilities and industrial zones. In short, the 'factory' was a logical response to the high costs of moving human labour and ideas cross borders.[5] Moreover, the high costs of moving ideas across borders deepened the wealth disparity between the advanced nations and the less developed nations. The concentrated nature of production – the only economical option, as mentioned above – triggered self-reinforcing cycles of innovation, industrial growth, and income growth in an elite group of nations (broadly speaking, the 'west' and Japan). But the innovations generated in the course of this virtuous cycle could not be easily transferred to foreign lands.[6]

[3] Ibid., pp. 120-122.

[4] Ibid., p. 121.

[5] Ibid., pp. 122-123.

[6] Ibid., pp. 123-124.

1.1.2 Moving ideas across borders

The state of affairs described in the previous section was finally upended, from the 1990s onwards, by the new technologies of the 'ICT revolution' – namely, the computer, the internet, and other related systems. The ICT revolution, Baldwin explains, finally drove down the costs of transmitting and communicating sophisticated knowledge across borders.[7] This meant that it was now possible to disaggregate production processes and stages and spread them across different international locations. In short, low-cost communications had finally made it possible for firms to organise and manage so-called 'global value chains'. The advanced economies thus began to 'outsource' production stages and processes to low-wage nations. In effect, they exported their 'ideas' – their production knowledge and the fruits of their innovation efforts – to foreign sources of low-cost labour.[8] This process triggered deindustrialisation in the advanced economies and boosted the economic and industrial strength of the parts of the developing world that were the main recipients of the exported 'ideas'.[9]

By driving down the costs of shifting ideas across borders, ICT made it economical and feasible for firms to export production capabilities.[10] However, the ICT revolution, in Baldwin's opinion, did not drive down the costs of moving labour across borders. At the same time, in-person collaboration remained necessary for ensuring the smooth operation of global value chains. The implication was that the 'people' managing global value chains still needed to be located within reasonable reach of each other. This was reflected in the concentration of labour and talent in major urban centres and the tendency for advanced economies to outsource production to nations in their geographical backyard.[11]

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[7] Ibid., pp. 130-131.

[8] Ibid., pp. 5-8, 132-134 and 142-144.

[9] Ibid., pp. 86-91 and 135.

[10] Ibid., pp. 143-144.

[11] Ibid., pp. 7 and 132-133.

1.1.3 The future of globalisation

What does the future hold for globalisation? Baldwin believes that the next phase of globalisation ('Globalisation 4.0') will be powered by technologies that will finally drive down the costs of moving human labour across borders.[12] He is not referring, in this vision of the future, to new technologies that will magically speed up the *physical* movement of human labour across borders. Instead, Baldwin is referring to new digital technologies that will lead to highly advanced forms of international remote working. This will allow professionals and workers to perform tasks for foreign customers without crossing national borders.[13]

According to Baldwin, these technological developments could lead to dramatic changes in the service sector. Many services, unlike goods and ideas, do not enter into the flows of international exchange. For example, you cannot 'export' or 'import' hairdressing or many types of repair services. Many services at present can only be delivered *and* received *in-person* and *on-site*. The hairdresser cannot 'export' his/her hairdressing services to someone living in another country who wants a haircut. Futuristic remote working technologies, however, may finally allow a broader range of services to become *exportable and importable*. When this happens, high-cost service sector workers in certain countries will finally be forced to compete with equally skilled low-cost service sector workers from other parts of the world.[14] It is too early to tell if this vision of future globalisation will come to pass, but it cannot be denied that a degree of change is afoot. We have already seen successful demonstrations of remote surgery.[15] More recently, the pandemic has triggered

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[12] Ibid., pp 141 and 283; and Richard Baldwin, 'If this is Globalisation 4.0, what were the other three?', *VoxEU*, 19 December 2018, at https://voxeu.org/content/if-globalisation-40-what-were-other-three, accessed 22 October 2021.

[13] Baldwin, *The Great Convergence*, pp. 288-290, 295-296, and 298-300.

[14] Ibid., pp. 299-300.

[15] See, for example, Rose Eveleth, 'The surgeon who operates from 400km away', *BBC*, 16 May 2014, at https://www.bbc.com/future/article/20140516-i-operate-on-people-400km-away, accessed 22 October 2021; and Caroline Frost, '5G is being used to perform remote surgery from thousands

the vast expansion of remote learning and teaching.[16] Also, remote hairdressing, as a recent 5G stunt shows, may not be that far-fetched after all.[17]

1.2 Physical globalisation versus digital globalisation

Baldwin's thoughts on Globalisation 4.0 mirror a key trend in contemporary discussions on the future of globalisation. Technological change in the digital age may trigger the decline of certain aspects of *physical* globalisation (i.e. the physical movement of goods and labour across borders – recall that, in Baldwin's predictions on the future of globalisation, workers may not need to physically travel across borders in order to deliver their services).[18] According to the late Finbarr Livesey, even the practice of exporting production capabilities to foreign lands – the result, as mentioned above, of the ICT

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of miles away, and it could transform the healthcare industry', *Business Insider*, 16 August 2019, at https://www.businessinsider.com/5g-surgery-could-transform-healthcare-industry-2019-8, accessed 22 October 2021.

[16] Cathy Li and Farah Lalani, 'The Covid-19 pandemic has changed education forever. This is how', *World Economic Forum*, 29 April 2020, at https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/, accessed 22 October 2021.

[17] Martyn Landi, '5G hair: London barber demonstrates remote hairdressing robot', *The Star*, 29 May 2021, at https://www.thestar.com.my/tech/tech-news/2021/05/29/5g-hair-london-barber-demonstrates-remote-hairdressing-robot, accessed 22 October 2021.

[18] See, for example, Rebecca Keller, 'Why this era of globalization is coming to an end', *MarketWatch*, 7 June 2016, at https://www.marketwatch.com/story/why-this-era-of-globalization-is-coming-to-an-end-2016-06-07, accessed 22 October 2021; Finbarr Livesey, 'Why 2017 could be the year globalisation dies', *Wired*, 17 May 2017, at https://www.wired.co.uk/article/finbarr-livesey-globalisation, accessed 22 October 2021; Finbarr Livesey, 'Will robots spell the end of globalisation?', *Prospect*, 10 July 2017, at https://www.prospectmagazine.co.uk/economics-and-finance/will-robots-spell-the-end-of-globalisation, accessed 22 October 2021; Harry Moser, 'How Automation Accelerates Reshoring – Part 1', *Assembly*, 11 December 2020, at https://www.assemblymag.com/articles/96038-how-automation-accelerates-reshoringpart-1, accessed 22 October 2021; and Harry Moser, 'How Automation Accelerates Reshoring – Part 2', *Assembly*, 9 February 2021, at https://www.assemblymag.com/articles/96131-how-automation-accelerates-reshoringpart-2, accessed 22 October 2021.

revolution – may gradually go out of fashion (but without disappearing) due to the interaction between new technologies and other business and regulatory trends.[19]

It is important to note, though, that the appearance of signs of physical de-globalisation does not necessarily mean that world production is in absolute decline. It simply means that production is becoming more localised or regionalised, resulting in weaker cross-border flows of physical goods.[20] Also, physical de-globalisation need not mean the end of digital globalisation (i.e. the growth of international flows of data). Indeed, it has been argued that digital globalisation will continue to proceed apace even as physical globalisation decelerates.[21] But this divergence in the respective directions of digital and physical globalisation should not be taken to mean that the two phenomena are completely unrelated. In a good many situations, they are, in fact, two sides of the same coin. After all, we often need to move data across borders in order to move or as part of the process of moving goods, capital, and labour across borders.[22]

It should be noted, before we proceed any further, that it is not our intention to suggest that the arguments and predictions made by Baldwin and Livesey are universally accepted.[23] The course of globalisation is the subject of ceaseless public debate. We have chosen to

[19] Livesey, 'Why 2017 could be the year globalisation dies'; and Livesey, 'Will robots spell the end of globalisation?'.

[20] Finbarr Livesey, *From Global to Local: The Making of Things and the End of Globalization* (New York, 2017), pp. 9-10 and 21.

[21] James Manyika, Susan Lund, Jacques Bughin, Jonathan Woetzel, Kalin Stamenov, and Dhruv Dhingra, 'Digital globalization: The new era of global flows', *McKinsey & Company*, 24 February 2016, at https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-globalization-the-new-era-of-global-flows, accessed 22 October 2021.

[22] Ibid.

[23] For a sceptical review of Livesey (2017), see Jeffrey Sachs, 'End of Globalization? Maybe, Maybe Not', *Finance and Development*, September 2017, at https://www.imf.org/external/pubs/ft/fandd/2017/09/book2.htm, accessed 23 October 2021.

highlight these scholarly contributions simply because they demonstrate the complexity of the relationship between technological change and globalisation.

1.2.1 Technological change and physical de-globalisation

The growth rate of international trade decelerated in the aftermath of the global financial crisis of 2007-2008.[24] International investment was also weak in the years following the financial crisis.[25] In contrast, international flows of data were unscathed and continued to grow at astronomical rates.[26] Digital globalisation (as measured by international flows of data) was still powering ahead, while traditional physical globalisation seemed to be in long-term decline. Simply put, more firms were choosing to locate production at home or closer to home. Why was this the case? Livesey argued that the answer could be partly located in technological change.

Livesey highlighted the trade implications of the rise of 3D-printing or additive manufacturing. He singled out the 3D-printing of uncomplicated body parts directly on the premises where patients were receiving medical care as an example of the potential promise of additive manufacturing in reducing the role of trade in conveying goods to consumers.[27] As regards traditional manufacturing, Livesey noted that the use of 3D-printing would reduce the complexity of industrial designs. This, he argued, would have a major impact on global trade, the greater part of which comprised trade in intermediate components.[28]

In an earlier section, we saw how the ICT revolution facilitated the outsourcing of production by driving down the costs of moving ideas across borders. Livesey argued that new digital technologies and business priorities would discourage businesses from

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[24] Livesey, *From Global to Local*, pp. 9-10.

[25] Ibid., pp. 10-12.

[26] Ibid., p. 12.

[27] Ibid., pp. 46-48.

[28] Ibid., p. 51.

offshoring production stages to distant lands. Businesses, Livesey pointed out, were now more interested in customising their products for consumers.[29] Large-scale customisation was now feasible due to the use of digitised supply chains – one of the commonly remarked on applications of the Fourth Industrial Revolution[30] – that could tie consumer activity with factory activity.[31] Livesey noted that, in time, the drive to achieve large-scale customisation would persuade companies to tighten their control of their supply chains instead of offshoring most production stages to foreign lands.[32] In addition, the growing customer demand for rapid deliveries, which, Livesey pointed out, could be partially attributed to the influence of e-commerce companies, would also persuade firms to situate more production processes *in* the countries where customer purchases were occurring.[33]

Livesey also argued that automation and climate change would encourage the localisation and regionalisation of production. Automation, he noted, had reduced the burden of labour costs and had thus also reduced the benefits of exporting production capabilities to low-wage nations.[34] At the same time, the need to control emissions would persuade companies to reassess the wisdom of shipping goods and parts – an emissions intensive activity – across great distances.[35]

Thus, we see that technological change and new business priorities in the digital age may facilitate physical de-globalisation. Firms may ship fewer goods and production

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[29] Ibid., pp. 53-55.

[30] See, for example, Knut Alicke, Jürgen Rachor, and Andreas Seyfert, 'Supply Chain 4.0 – the next-generation digital supply chain', *McKinsey & Company*, 27 October 2016, at https://www.mckinsey.com/business-functions/operations/our-insights/supply-chain-40--the-next-generation-digital-supply-chain, accessed 23 October 2021.

[31] Livesey, *From Global to Local*, p. 55.

[32] Ibid.

[33] Ibid., pp. 137-138.

[34] Ibid., pp. 67-69, 73-74, and 78-80.

[35] Ibid., pp. 111-112.

capabilities across national borders. If Richard Baldwin's predictions (as explained in section 1.1.3) come to pass, the need for physical migration will also be heavily reduced.

But, as mentioned earlier, physical de-globalisation can co-exist with vigorous digital globalisation. Given the centrality of digital technologies and platforms to many aspects of our lives, it would be unwise to treat the physical movement of goods and labour across national borders as the sole representative indicator of the true scale of the integration of global markets. Instead, any assessment of the degree to which global markets are integrated must take into account the international flows of data arising from, among other digital or digitally mediated activities, social media interactions, generic search activity, e-commerce, online payments, digital banking, cloud computing services, the online streaming of entertainment goods, online learning, teleworking, videoconferencing, artificial intelligence systems, and blockchain platforms. Indeed, perhaps the distinction between physical de-globalisation and continued digital globalisation is an unhelpful one. One could just as well say, with far more simplicity, that globalisation is not in reverse but is instead simply assuming a digital form.[36] This trend, moreover, appears to have been hastened by the forcible shift of many traditional physical activities to the so-called 'borderless' online plane during the pandemic.[37]

We should bear in mind, for a sense of perspective, that the figures generated by contemporary digital activities are truly immense. The economist Jeffrey Sachs notes that, in 2019, there were 1.6 billion and 3.5 billion Facebook logins and searches performed on Google *per day*.[38] Sachs also notes that it was anticipated that the quantity of data

[36] Laura D'Andrea Tyson and Susan Lund, 'Globalization isn't in retreat. It's just gone digital', 21 February 2017, *World Economic Forum*, at https://www.weforum.org/agenda/2017/02/why-globalization-isnt-it-in-retreat-its-gone-digital, accessed 23 October 2021.

[37] Ian Goldin, 'Covid-19 proves globalisation is not dead', *The Financial Times*, 26 August 2020, at https://www.ft.com/content/d99fa0e9-2046-4587-b886-7d42252b6fc9, accessed 23 October 2021.

[38] Jeffrey D. Sachs, *The Ages of Globalization: Geography, Technology, and Institutions* (New York, 2020), p. 169.

generated and diffused internationally in 2020 would hit 44 zettabytes per day.[39] But, impressive as these numbers may be, one should not assume that digital globalisation is an unstoppable force of nature that is beyond the reach of nationalistic and protectionist governments. International flows of data are every bit as subject to the political and policy preferences of governments and the public as the flows of physical exchange are. Government-built 'borders' do exist in cyberspace. One prominent example would be the 'Great Firewall' of China, a highly complex censorship operation that prevents Chinese residents from accessing certain foreign websites. Many governments, both democratic and authoritarian, have also implemented 'data localisation' measures in order to regulate and limit cross-border data flows.[40] The digital realm is thus anything but immune to de-globalisation.

Watch

'Is additive manufacturing hope or hype?', *Enterprise Singapore*, published on 12 August 2021, at https://www.youtube.com/watch?v=LdLc2EpqsYs, accessed 23 October 2021.

[39] Ibid.

[40] Akash Kapur, 'The Rising Threat of Digital Nationalism', *The Wall Street Journal*, 1 November 2019, at https://www.wsj.com/articles/the-rising-threat-of-digital-nationalism-11572620577, accessed 23 October 2021.

Read

Christopher H. Lim and Tamara Nair, 'How 3D printing could disrupt Asia's manufacturing economies', *The Conversation*, 10 January 2017, at https://theconversation.com/how-3d-printing-could-disrupt-asias-manufacturing-economies-69633, accessed 23 October 2021.

Activity 2.1

Globalisation and Technology: The View from Singapore

Watch/read the video/article above on 3D printing/additive manufacturing and answer the following question:

How will the rise of additive manufacturing affect the integration of the Singaporean and ASEAN economies with global markets?

Chapter 2: Technological Change and Diffusion in the Digital Age

This short chapter discusses two topics / questions: first, what does it mean to be digital, and second, how and why technology evolve and diffuse during the Digital Age. For the purposes of this course, we will take the Digital Age to refer to a period of time characterised by quick and massive information flows, buttressed by computers, electronic and computerised processes, and related technologies.[41]

2.1 Being Digital

What does digital or being digital mean? The term "digital" comes from "digit", referring to the numbers 0 to 9. Essentially, "digital" means to store or communicate information as a series of the numbers 0 and 1, or in a binary format.[42] This contrasts with the term "analogue", which refers to data that is represented by a "continuously variable physical quantity", in other words, attributes that can be physical measured, e.g. length, weight, voltage, pressure, or spatial positions.[43] One comparative example would be the digital clock or watch using digits to show the time, and an analogue version that uses the hour and minute hands. Another example would be the data or images stored in a

[41] This understanding is based on various sources, including Cambridge Dictionary, https://dictionary.cambridge.org/dictionary/english/digital-age; Timothy Williamson, History of computers: A brief timeline, https://www.livescience.com/20718-computer-history.html; Manuel Castells, (1996–98).The Information Age: Economy, Society and Culture, 3 vols. Oxford: Blackwell; Tom Goodwin, The three ages of digital, 24 June 2016, https://techcrunch.com/2016/06/23/the-three-ages-of-digital/; and Steve Denning, How The Digital Age Is Reinventing (Almost) Everything, 5 Sept 2021, https://www.forbes.com/sites/stevedenning/2021/09/05/how-the-digital-age-is-reinventing-almost-everything/?sh=63f48cbbe7f3

[42] Definition adapted from Cambridge Dictionary, https://dictionary.cambridge.org/dictionary/english/digital

[43] Definition adapted from Google's English Dictionary, powered by Oxford Languages.

SD or micro-SD card (SD stands for Secure Digital)[44], compared to images captured in 35mm film. Another example: imagine physical papers, files and cabinets and their digital counterparts in the personal computers and laptops we are so familiar with. At its essence, being digital denotes something not immediately tangible or almost abstract to those who may be more used to analogue technology.

What words, phrases, characteristics or even objects come to mind when you see the word 'digital'? In Singapore, the Covid-19 pandemic has arguably hastened the move towards "being digital". In concrete terms, this could refer to hawkers and food-sellers, deprived of their regular and walk-in customers, turning to online platforms to ensure the survival (if not the sustainability) of their livelihoods. It could refer to a Luddite, a term referring to a person opposed to all forms of technology,[45] having to force him- or herself to learn how to make e-payments or how to use Zoom (or other video-conferencing platforms) to be able to continue to study, work or to keep in touch with loved ones stranded away from home. It could also refer to a teacher rethinking how to communicate content that was previously delivered in a physical classroom and to engage a faceless audience online.

The brief examples outlined above indicate the use of technology as well as learning how to use technology to continue work and everyday life as an aspect of being digital. The rationale for Singapore's Smart Nation initiative may provide a bit more insight. The Digital Society pillar focuses on enabling Singaporeans digitally, especially the older and vulnerable sections of the population. The identified "digital enablers" are a mobile device with a network connection, Internet access, a bank account with card facility,

[44] dpreview Staff, Three Giants to develop new "Secure Memory Card", 24 Aug 1999, https://www.dpreview.com/articles/6861681955/newmemory

[45] The term refers to a movement or organisation of British textile workers during nineteenth century who opposed the introduction and use of machinery in their factories, for fear that they would be replaced. The movement was named after a fictional character Ned Ludd. For a fun read of how the term took on different meanings over time, see Richard Conniff, What the Luddites Really Fought Against, March 2011, https://www.smithsonianmag.com/history/what-the-luddites-really-fought-against-264412/

and a national digital identity.[46] The Digital Economy pillar focuses on preparing (and hence changing) the economy through "digitalising industries", integrating ecosystems", and "industrialising digital".[47] The Digital Government pillar posits that elements of a digital government must include "services that are easy to use, reliable and relevant" and "seamless digital transactions".[48]

Taken together, we can begin to tease out the essence of what digital is or being digital could mean (at least from the perspective of those responsible for the Smart Nation initiative). Some of the words or phrases associated with being digital include "seamless", "integrated", "relevant", and "easy to use". Being digital also requires the necessary devices and Internet connectivity, which in turn also means the required training or education to become familiar with using them. The "digital enablers" of the Digital Society pillar moreover are to provide a basis for greater inclusivity. This is an understated but significant reference to how the speed of technological developments during this Digital Age can outpace human capabilities to adapt or be familiar with a particular device or software at a time. Put in another way: imagine returning to school or to work after an extended period of time away from either. We may encounter teething problems in familiarising ourselves be familiar with different systems and devices just to ensure we are able to do the basics. Indeed, the pace of technological change and diffusion during this Digital Age is such that we could be required to learn something new could by the time we feel sufficiently confident or familiar to use the first device. As such, perhaps another characteristic of being digital is being be sufficiently knowledgeable or adventurous to manage multiple systems and devices simultaneously.

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[46] Singapore Ministry of Communication and Information (MCI), Digital Readiness Blueprint, https://www.mci.gov.sg/en/portfolios/digital-readiness/digital-readiness-blueprint

[47] Singapore Infocomm Media Development Authority, Digital Economy Framework for Action, https://www.imda.gov.sg/infocomm-media-landscape/SGDigital/Digital-Economy-Framework-for-Action

[48] Singapore Smart Nation. Pillars of a Smart Nation. https://www.smartnation.gov.sg/about-smart-nation/pillars-of-smart-nation#digital-government

Perhaps this is where the idea of "born-digital" is relevant. Originally used in the context of archivists grappling with the impact of digital technology on the creation of archival records, the term born-digital refers to materials created digitally. This would include documents created using word processors, electronic mails (or e-mails), text messages, spreadsheets, presentations etc., and can extend to art, literature and music created digitally.[49] This is different from converting analogue materials into digital form, e.g. scanning a piece of paper of photographs. In the field of archival science and historical research, the idea of born-digital requires a mindset shift of sorts, i.e. archivists need to look beyond the traditional forms of documentation or material creation in general, and likewise, historians need to be aware of electronic forms of communication that could form the basis of future historical source materials.

If we expand the idea of born-digital, we would see that from say the first decade of the twenty-first century, there is a generation of people that is likely to be less familiar with analogue materials and approaches Take for instance banking. In Singapore, those born in earlier periods are likely to be more familiar with the savings passbook issued by banks, and the regular need to go to the bank in person to update the book to keep an eye on our financial transactions. For those born later (i.e. Generation Z – those born from the late 1990s), their first introduction to banking is likely to be a digital app on their mobile devices. Extending the example, children could potentially grow up more used to socialising digitally or online, rather than regularly interacting with potential friends or foes face-to-face.[50] This and other social implications of being born digital are explored by Robert Wigley in a recent publication called *Born Digital: The Story of a Distracted Generation*.[51] He warned that certain human activities we have taken for granted, such as playtime, family dinners and other forms of face-to-face interaction, are being replaced

[49] Yale University, what does "born digital" mean, undated, https://primarysources.yale.edu/what-does-born-digital-mean

[50] Cliff Saran, What it means to be born digital, 1 Mar 2021, https://www.computerweekly.com/news/252496622/What-it-means-to-be-born-digital

[51] Robert Wigley, *Born Digital: The Story of a Distracted Generation* (UK: Whitefox Publishing Ltd., 2021).

by digital distractions. This in turn crucially undermines the attributes such activities cultivate, such as empathy, i.e. the simple understanding of the impact of their words and actions by observing facial reactions or other forms of body language. Wigley warns that the world is "sleepwalking" into a "crisis of distraction", a reference to how mobile devices are given to children to distract them.[52]

Hence, in thinking about digital transformations, we must keep in mind the serious social implications that balance out the obvious benefits of digital technologies for everyday work and living. Perhaps one solution is to keep in view the fundamental objective of adopting any type of digital technology or method, whether it is providing convenience for everyday life, to make businesses more efficient, or out of pure human curiosity, which at its very core keeping or enhancing analogue processes. A scholar of Middle Eastern literature and history remarked that when thinking of born digital projects, people seem to want to create something completely new, usually by severing the link with the analogue world.[53] He had attempted to design and implement a digital project (i.e. digitising a corpus of Arabic poems, text-analysis algorithms to facilitate cross-referencing, and platforms for scholarly exchange and public participation). Results were mixed, and he realised that the problems encountered were not "high-tech born digital" issues but rather analogue ones, such as "establishing stable texts, accounting for variations in those texts, and dealing with problems of authorship".[54] He concluded that he might have served his community and audience better by replicating the analogue process of publishing a book of Arabic literature in digital form, or at least streamline the process using digital tools.

In sum, being digital or born digital need not mean something completely new, identified with ICT, or something that should ideally be distinct from the analogue world, especially

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[52] Cliff Saran, What it means to be born digital, 1 Mar 2021, https://www.computerweekly.com/news/252496622/What-it-means-to-be-born-digital

[53] Elias Muhanna, "What Does "Born Digital" Mean?" *Int. J. Middle East Stud.* 50 (2018). Accessible via SUSS Library: https://search.library.suss.edu.sg/permalink/65SUSS_INST/1gllksm/cdi_crossref_primary_10_1017_S0020743817000976

[54] Ibid.

if the initial objectives are meant to complement or enhance analogue processes. Still, the attraction of digital technologies for work and everyday living cannot be denied. Hence, as widespread diffusion of such technologies is likely to continue at a quickened pace, we can afford to be more aware and circumspect of their implications for society in general.

2.2 Evolution and Diffusion of Digital Technology

The pace of development and diffusion of digital technologies is arguably unprecedented in human history. To illustrate, when the World Wide Web (WWW, i.e. various pages and sites in the Internet)[55] was introduced in 1990, only half a percent of the world's population was online. In ten years, half the population in America was connected online, while the rest of the world remained offline so to speak. In 2016 – about fifteen years after the WWW was first introduced, three-quarters of the American population were online, and the rest of the world has caught up, e.g. 98% in Iceland, 97% in Denmark and Norway, 93% in South Korea and Japan, and 81% in Singapore.[56]

Imagine the number of personal computers, mobile phones and similar devices, as well as the necessary Internet connectivity needed to support those percentages in a relatively short period of time.[57] Data on the adoption of various technologies by American households gives us some insight. Cellular phone usage went from 10% in 1994 to 96% in 2019, an 860% increase in twenty-five years, while smartphones started at 35% in 2011 and surged to 81% in 2019 – a 131% increase in eight years. Use of the microcomputer (also

[55] For a quick overview of the differences, seee BBC Newsround video: World Wide Web vs Internet - What's the Difference? 11 Mar 2019, https://www.bbc.co.uk/newsround/47523993

[56] World Economic Forum, How has technology changed - and changed us - in the past 20 years? https://www.weforum.org/agenda/2020/11/heres-how-technology-has-changed-and-changed-us-over-the-past-20-years/. Information originally taken from Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina, "Internet", 2015, https://ourworldindata.org/internet

[57] Hannah Ritchie and Max Roser (2017) - "Technology Adoption". Published online at OurWorldInData.org. See especially: https://ourworldindata.org/technology-adoption#technology-adoption-in-us-households

know as the personal computer) surged by 851% in thirty-six years, i.e. 8.2% in 1984 to 78% in 2016. Correspondingly, Internet usage went from 10% in 1993 to 88% in 2016 – a 780% increase in twenty-three years; social media usage from 5% in 2005 to 79% in 2019 – a 1,480% increase in fourteen years.[58]

It has been suggested that the quick adoption rates have been partly due to consumers being more "connected, fast-acting, and not afraid to adopt the new technologies that can quickly impact their lives for the better."[59] It is also true that compared to older technologies that required substantial amounts of infrastructure to make adoption worthwhile, newer digital technologies require far less infrastructure. Take for instance the telephone. It was invented in 1876, but it took over 100 years for its adoption to reach saturation point, because "massive amounts of infrastructure had to be built and network effects also needed to accumulate to make the product worthwhile for consumers. Further, the telephone suffered from the "last-mile problem", in which the logistics get tougher and more expensive as end-users get hooked up to a network."[60]

This understated factoid, i.e. the significance of infrastructure, explains the relatively slow rate of adoption of other technologies, such as the petrol-powered motorised vehicle, with an internal combustion engine. Although motor cars had been available for mass use since late nineteenth century (1800s), the German army during the Second World War (1939 to 1945) was still heavily reliant on horses for military and logistical operations.[61] This is despite the fact Germany made significant technological strides during the war, especially in the areas of jet propulsion – resulting in the first operational jet plane, the first long-range cruise missile and guided ballistic missile; and atomic research – before the Allies pulled ahead with its Manhattan Project (which eventually led to the first nuclear

[58] Ibid.

[59] Jeff Desjardins, The Rising Speed of Technological Adoption, 14 February 2018, https://www.visualcapitalist.com/rising-speed-technological-adoption/

[60] Ibid.

[61] DiNardo, R. L., and Austin Bay. "Horse-Drawn Transport in the German Army." *Journal of Contemporary History* 23, no. 1 (1988): 129–42. http://www.jstor.org/stable/260872.

weapons). Germany's seeming focus on quality, compared to America's relative emphasis focus on mass production in out-producing the German war effort, was down mainly to Hitler's wish to not put the economy on a total war footing, and hence allocating resources to selected projects without reducing the German's overall standard of living.[62]

The above example is a useful window into the long history of varied motivations behind technological developments, as well as the corresponding need for infrastructure to support those technological developments. As we have seen with the German example, war was a major catalyst and motivation for technological developments, if only to ensure efficiency in military operations (i.e. fewer casualties, greater impact). Throughout human history, technological innovations are usually driven by a particular need, be it social, economic or political. For example, steam-powered engines first emerged in in the eighteenth century, motivated by the intent to reduce dependency on natural elements, such as water or wind, or manual labour. Automated machinery and motorised vehicles were invented to replace livestock or human error in various sectors of the economy, such as agriculture and manufacturing. Nuclear weapons (drones) were developed for maximum impact (with minimal casualties or resources), and pilotless missiles or planes developed to minimise or do away with human risk. Whichever example you may think of, it is highly likely that the initial motivation to develop any technology was a basic human instinct, influenced by specific circumstances of that example, to make existing processes quicker, more efficient or more impactful.

Invention does not immediately lead to widespread adoption and diffusion. Transfers of technological skills, knowledge and equipment are still dependent on how individuals and countries communicate with each other across the world. Hence, early technological developments in ICT, such as the telegraph, railways, and steam-powered shipping, were critical in bringing the world "closer" together – along with European imperialism. In this Digital Age, communicative platforms have advanced to a stage (and still developing) where geographical and temporal distances are rendered almost meaningless. We can

[62] John Keegan, *The Second World War*, pp. 172-173.

send messages via electronic mail or text messaging instead of relying on earlier snail mail processes. We can call (or Skype of Zoom with) someone on the other side of the world without having to go through a human operator. Such technologies have made even more obvious the essence of globalisation, i.e. an interplanetary convergence, or at least supporting a sense of being closer together.

This of course should not blind us to certain realities of resistance or apprehension. For instance, technological diffusion are also dependent on how receptive societies are to receiving such technological transfers in the first place. You would have read about in Study Unit 1 the Amish community's calibrated approach to technology, i.e. adopting technologies as and when they help support their community. For a period of time, the Qing rulers of Imperial China publicly denied foreign technologies for fear their authority within Chinese borders would be undermined[63] – a sentiment perhaps not all that different from the motivation to erect the Great Firewall (which at this time of writing continues to keep out Western counterparts of digital platforms). For those of us who grew up with analogue forms and processes, do you remember the first time you attempted to navigate the smart phone, or the various software or apps in a tablet? The underlying concern or even apprehension when conducting our first online financial transaction? Afterwards, how did we get past that to the point where operating digital processes become second nature, or even expecting something digital to begin with?

2.3 Moving Towards the Personal / Individual

Part of the answer to last question above is perhaps the individualised, personalised nature of such "smart" devices that are characteristic of this Digital Age. They are "smart" primarily because they can be configured, with the supporting applications, to meet our personal preferences and needs in most if not aspects of our everyday life. We have smart devices where at the touch of our fingers (and thumbs) we can work, study or play without

[63] There is evidence to indicate that in private, the Qing rulers were extremely interested in Western technology. See Waley-Cohen. (1993). China and Western Technology in the Late Eighteenth Century. The *American Historical Review*, 98(5), 1525–. https://doi.org/10.2307/2167065

worrying about natural or external elements; conduct business and financial transactions; or communicate with others across vast geographical distances and different time zones. We have devices to assist in monitoring the health and safety of ourselves and loved ones, room temperatures and lighting in our homes, as well as entertainment systems – to name just a few features of an ideal "smart" home.[64]

It is possible to argue that the nature of these smart devices reflect the essence of globalisation, i.e. supporting some basic level of connectivity, in this case, between individuals and communities in different countries. As discussed in other parts of this study guide, early versions of globalisation were partly supported by early communication technologies, such as the telegram, the telephone and the wireless radio. The invention and commercialisation of the transistor after the Second World War was a significant moment in the history of technological developments and human history. The transistor is a "semiconductor device for amplifying, controlling, and generating electrical signals."[65] This device is a core part of computer memory chips and microprocessors, integral elements of the tools of the Digital Age, such as laptops, smartphones and tablets. The original transistor was invented by William Shockley, Walter Brattain and John Bradeen in 1947. They were members of what was known then as Bell Telephone Laboratories, which was named after Alexander Graham Bell, inventor of the telephone and co-founder of the American telecommunications company, American Telegraph and Telephone (AT&T).

The first commercial use of the transistor was in hearing aids and portable radios. Over time it replaced the original vacuum tubes used in computers, and in doing so, paved the way for the Digital Age, also known as the Information Age. Mainframe computers have been around since the early twentieth century, used mainly for calculations of large

[64] Watch the promotion video in Smart Nation Singapore, The Smart Town Framework, https://www.smartnation.gov.sg/initiatives/urban-living/smart-towns. The video URL is: https://www.youtube.com/watch?v=nvEQE84SK1g

[65] Britannica, Transistor, https://www.britannica.com/technology/transistor

amounts of complex data.[66] Computers were used during the Second World War to break ciphers and coded communications. After the Second World War, the small-sized and low-powered transistor[67] helped paved the way for a more personal approach to the computer. The phrase "personal computer" was first coined by Ed Roberts, co-founder of MITS (Micro Instrumentation and Telemetry Systems) and the inventor of the Altair 8800 in 1974. The Altair is generally seen as the first commercially successful personal computer, in the sense that it inspired the personal computer industry. A few years later in 1977, the trinity of personal computers, the Apple II, the TRS-80 and the Commodore PET, appeared on the market, which targeted home-users. These were the precursors to devices we are familiar with today, such as the laptop (first appeared in 1982), the tablet (first appeared in 1989) and the smartphone with a touchscreen (first appeared in 1994).

The next significant point in the history of Digital Age, especially in the development of the notion of the "personal", is the launch of the World Wide Web (WWW) in 1990. To be clear, the WWW is different from the Internet. The latter, in essence, is a system connecting computers into a network. The earliest version of such a network was created by the American Department of Defense's Advanced Research Projects Agency (ARPA) in 1969. The ARPAnet, as it was called, enabled computers at four American universities to exchange information, making it the forerunner to the Internet we are familiar with.[68] Research and development created more computer networks, which paralleled and intensified with the growing significance of personal computers from the 1970s, during

[66] See various entries in Computer History Museum, Timeline of Computer History, https://www.computerhistory.org/timeline/computers/

[67] Britannica, Transistor, https://www.britannica.com/technology/transistor

[68] National Science Foundation (NSF), NSF and the Birth of the Internet (1960s) https://www.nsf.gov/news/special_reports/nsf-net/1960.jsp

which the first electronic mail was emailed in 1972.[69] Over time, ARPAnet evolved into the Internet, which debuted in 1983.

The 1990s is the decade the world went online. In 1990, developing the idea of hypertext as a way to navigate the Internet, physicist Tim Berners-Lee at CERN (the European Organization for Nuclear Research) in Geneva created the basis of the World Wide Web, replete with a server, HTML, URLs and the first browser.[70] The following year in 1991, the National Science Foundation (NSF) removed commercial restrictions on the Internet, making it publicly accessible for the first time.[71] Public access to the WWW and the Internet was arguably the spark of the Digital Age as both elements combined to ensure the exchange and flow of massive amounts of information.

At first glance, the flow and exchange of information does bring individuals and communities around the world closer together. At the same time, social networking applications or platforms that sprung up after the 1990s also accentuate the personal, i.e. they were originally designed to cater to our individual preferences, our likes and dislikes, amidst our innate need to connect to other individuals. Launched in 2003, Myspace was the first and most visited social networking website, until it was surpassed by Facebook some time after the latter was made publicly accessible in 2008. The idea of the "personal" is perhaps the other significant characteristic of the Digital Age. This does not merely mean catering to our individual preferences, but more significantly, but also the opportunity via the WWW and Internet to express and share your personal thoughts and opinions to an audience beyond the physical confines of our immediate environment. The ability to convey our thoughts and actions (through text, images, emoji's etc.) arguable makes the

[69] NSF, NSF and the Birth of the Internet (1970s) https://www.nsf.gov/news/special_reports/nsf-net/1970.jsp. See also Computer History Museum, Timeline of Computer History: Networking and the Web, https://www.computerhistory.org/timeline/networking-the-web/

[70] Computer History Museum, Timeline of Computer History: Networking and the Web https://www.computerhistory.org/timeline/networking-the-web/

[71] Ibid.

digital experience an extremely personal one, one which moreover contrasts with broader societal, national and global imperatives which Study Unit 3 will explore.

Summary

In sum, Study Unit 2 asks us to consider some of the broader economic and social implications of globalisation in this Digital Age. At first glance, it may appear that globalisation has sped up as a result of increased adoption and diffusion of digital devices. But as this first topic of Study Unit 2 discusses, there may be a difference between physical globalisation and digital globalisation. The latter may bring communities across the world closer together, but certain aspects of physical globalisation – the original basis of earlier cycles of globalisation – may actually slow or even enter a de-globalisation phase. In other words, while the exchange of ideas may increase with improvements in digital communications, the exchange of goods, services and labour may slow or even reverse. Hence, it is important to be aware of different types of globalisations, which in turn may have varying implications and consequences.

The second chapter of Study Unit 2 invites us to take a couple of steps back and reflect on what it means to be digital, and from there, reflect on the implications of our understanding of the term. The term "digital" has evolved beyond its original binary meaning of zeroes and ones, especially when applied to various social contexts, which usually take it to mean something progressive, modern, convenient or efficient. That is why it is important to remember the so-called analogue origins of digital devices, and indeed the continued presence and necessity of non-digital infrastructure to support digital communications. One does not exist without the other, and both will always be anchored by conventional human motivations to invent and innovate technologically.

Formative Assessment

1. According to Richard Baldwin, which of the following technologies was responsible for driving down the costs of moving ideas across different markets?
    a. Steam transport
    b. The telephone
    c. ICT
    d. Diesel transport.

2. According to Richard Baldwin, what will be the core feature of 'Globalisation 4.0'?
    a. The emergence of new technologies that will greatly accelerate the physical movement of people across borders.
    b. A broader range of services will enter into the flows of international exchange.
    c. The transnational corporation will become economically irrelevant.
    d. Workers in developed nations will no longer face competition from workers in poorer nations.

3. Which of the following statements about digital globalisation is correct?
    a. Digital globalisation is the result of physical de-globalisation.
    b. Digital globalisation and physical globalisation are completely separate phenomena.
    c. Digital globalisation began at the start of the twentieth century.
    d. Digital globalisation can occur at the same time as physical de-globalisation.

4. According to Finbarr Livesey, which of the following factors may contribute to the localisation and regionalisation of production?
    i. The consumer demand for quick deliveries
    ii. The need to fight climate change
    iii. Automation

a. Option i only.
b. Options ii and iii only.
c. Options i and iii only.
d. Options i, ii, and iii.

5. Digital globalisation is irreversible.
    a. True.
    b. False.

6. According to Study Unit 2, which is the most appropriate description of the Digital Age?
    a. The Digital Age refers to a period of time characterised by quick and massive information flows, buttressed by computers, electronic and computerised processes, and related technologies. It is also known as the Information Age.
    b. The Digital Age is described as such because of societies communicating in digital forms, i.e. ones and zeroes.
    c. The Digital Age is a historic period characterised by advanced Artificial Intelligence (AI) technologies.
    d. The Digital Age is an Age of Digits.

7. According to this Study Unit, the concept "born-digital" originated in which of the following disciplines:
    a. Computer Science
    b. Design Thinking
    c. Archival Science
    d. Digital Media

8. According to this Study Unit, the Digital Age would not have been possible without which of the following technological innovation:
    a. Computer

b. Transistor

c. Smartphone

d. Internet

9. Which of the following are factors for enabling the faster adoption and diffusion of ICT (Information and Communication Technologies) and related digital technologies?

   a. Consumers are generally more savvy and eager to use new technologies.

   b. Crises, such as international conflicts, global pandemics, or even a local community issue, necessitating innovation to present immediate and urgent solutions.

   c. Natural human curiosity as well as the innate need to compete with each other.

   d. More connected, fast-acting, and unafraid consumers, and supporting infrastructure to make adoption of technologies worthwhile.

10. The Internet is another name for the World Wide Web.

    a. True

    b. False

Solutions or Suggested Answers

Formative Assessment

1. According to Richard Baldwin, which of the following technologies was responsible for driving down the costs of moving ideas across different markets?

    a. Steam transport

    Incorrect. Steam transport drove down the costs of moving goods across borders, not ideas.

    b. The telephone

    Incorrect. According to Baldwin, the telephone (as well as the telegraph) did not drive down the costs of moving ideas across borders.

    c. ICT

    Correct. According to Baldwin, ICT drove down the costs of moving ideas across different markets from the 1990s onwards. This paved the way for the outsourcing of production processes to low-wage nations.

    d. Diesel transport.

    Incorrect. Diesel transport drove down the costs of moving goods across borders, not ideas.

2. According to Richard Baldwin, what will be the core feature of 'Globalisation 4.0'?

    a. The emergence of new technologies that will greatly accelerate the physical movement of people across borders.

    Incorrect. Baldwin believes, instead, that 'Globalisation 4.0' will witness the lowering of the costs of moving labour across borders via the emergence of advanced forms of remote working.

b. A broader range of services will enter into the flows of international exchange.

Correct. Baldwin believes that huge advancements in international remote working will finally render many hitherto unimportable/unexportable services importable/exportable.

c. The transnational corporation will become economically irrelevant.

Incorrect. Baldwin says no such thing.

d. Workers in developed nations will no longer face competition from workers in poorer nations.

Incorrect. On the contrary, advanced international remote working techniques will expose high-cost service sector workers in certain countries to competition from low-cost service sector workers from other countries.

3. Which of the following statements about digital globalisation is correct?

a. Digital globalisation is the result of physical de-globalisation.

Incorrect. Physical de-globalisation refers to the weakening of cross-border flows of goods, services, capital, and labour. There is nothing in this definition that implies that digital globalisation will automatically arise out of physical de-globalisation.

b. Digital globalisation and physical globalisation are completely separate phenomena.

Incorrect. Cross-border data flows often pave the way for or accompany cross-border movements of goods, capital, and labour.

c. Digital globalisation began at the start of the twentieth century.

Incorrect. Digital globalisation is a product of digital technologies. Such technologies did not exist at the start of the twentieth century.

d. Digital globalisation can occur at the same time as physical de-globalisation.

Correct. The growth of digital globalisation is manifested in the expansion of cross-border data flows. As shown in this study unit, it is possible for cross-border data flows to grow strongly even if cross-border flows of goods and capital are slowing down.

4. According to Finbarr Livesey, which of the following factors may contribute to the localisation and regionalisation of production?

i. The consumer demand for quick deliveries
ii. The need to fight climate change
iii. Automation

a. Option i only.

Incorrect. All options (i, ii, and iii), according to Livesey, will encourage the localisation and regionalisation of production.

b. Options ii and iii only.

Incorrect. All options (i, ii, and iii), according to Livesey, will encourage the localisation and regionalisation of production.

c. Options i and iii only.

Incorrect. All options (i, ii, and iii), according to Livesey, will encourage the localisation and regionalisation of production.

d. Options i, ii, and iii.

Correct. All options (i, ii, and iii), according to Livesey, will encourage the localisation and regionalisation of production. The consumer demand for quick deliveries will encourage firms to situate production processes in the country where the purchases are being originated. The need to fight

climate change may discourage firms from shipping goods across great distances, which is an emissions-intensive activity. Finally, automation reduces the burden of labour costs and thus reduces the need to outsource production to low-wage nations.

5. Digital globalisation is irreversible.

    a. True.

    Incorrect. Digital globalisation is as vulnerable to protectionism and economic nationalism as physical globalisation.

    b. False.

    Correct. Digital globalisation is as vulnerable to protectionism and economic nationalism as physical globalisation. Examples of digital protectionism include the 'Great Firewall' of China and data localisation regulations.

6. According to Study Unit 2, which is the most appropriate description of the Digital Age?

    a. The Digital Age refers to a period of time characterised by quick and massive information flows, buttressed by computers, electronic and computerised processes, and related technologies. It is also known as the Information Age.

    Correct. The Digital Age, or the Information Age, is differentiated from earlier periods in history by the predominant use of computers and related technologies, as well as the swiftness of information flows.

    b. The Digital Age is described as such because of societies communicating in digital forms, i.e. ones and zeroes.

    Incorrect. See explanation in correct answer.

c. The Digital Age is a historic period characterised by advanced Artificial Intelligence (AI) technologies.

Incorrect. See explanation in correct answer.

d. The Digital Age is an Age of Digits.

Incorrect. See explanation in correct answer.

7. According to this Study Unit, the concept "born-digital" originated in which of the following disciplines:

a. Computer Science

Incorrect. See explanation for correct answer.

b. Design Thinking

Incorrect. See explanation for correct answer.

c. Archival Science

Correct. The idea of "born-digital" emerged in the archival sciences, as archivists began to grapple with the awareness that the forms of what they were archiving (e.g. paper, photos, audio and visual recordings) were rapidly changing, i.e. they were beginning to be created in digital forms.

d. Digital Media

Incorrect. See explanation for correct answer.

8. According to this Study Unit, the Digital Age would not have been possible without which of the following technological innovation:

a. Computer

Incorrect. The original computers were bulky contraptions or machinery, and hence limited to corporate or military uses before the invention of the transistor and the idea of a home or personal computer.

b. Transistor

Correct. The size and power of the transistor allowed for various types of technologies that paved the way for the personal mobility and access that characterise the Digital Age.

c. Smartphone

Incorrect. The smartphone is an important feature of the Digital Age, but is less likely to be a reality without the technologies made possible by the transistor.

d. Internet

Incorrect. Networks facilitating computerised information flows, such as the Internet, were originally limited or restricted. The full potential of the Internet was only realised when commercial restrictions were removed, allowing for near-unrestricted flows of information at a personal/individual level that characterise the Digital Age.

9. Which of the following are factors for enabling the faster adoption and diffusion of ICT (Information and Communication Technologies) and related digital technologies?

a. Consumers are generally more savvy and eager to use new technologies.

Incorrect. Consumers may be more savvy and eager, but they must also have the access and opportunities to be aware of and to use such technologies.

b. Crises, such as international conflicts, global pandemics, or even a local community issue, necessitating innovation to present immediate and urgent solutions.

Incorrect. As the saying goes, necessity is the mother of all invention. Nevertheless, it will still require further research and development to ensure application beyond the immediate / urgent objective of such technologies.

c. Natural human curiosity as well as the innate need to compete with each other.

Incorrect. While such factors important in the development and adoption of technologies, they do not always lead to the diffusion and adoption of technologies by others.

d. More connected, fast-acting, and unafraid consumers, and supporting infrastructure to make adoption of technologies worthwhile.

Correct. Consumers are but one part of the answer. Efficient and effective supporting infrastructure is also critical in encouraging quicker adoption and diffusion of ICT and related digital technologies. Older technological forms required more infrastructure, such as paved roads and fuel, compared to newer versions.

10. The Internet is another name for the World Wide Web.

a. True

Incorrect. See explanation for correct answer.

b. False

Correct. Though used interchangeably, the Internet and the World Wide Web are two different entities. Think of the Internet as the network

or architecture itself, and the World Wide Web as the sites or pages of information we use the Internet to access.

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Study Unit 3

The Politics of Globalisation in the Digital Age

Learning Outcomes

By the end of this unit, you should be able to:

1. Examine how nationalism has historically spread
2. Explain how digital technology exacerbates the fault-lines of the nation-state and how it is harnessed for national needs
3. Discuss attempts to curb and regulate the excesses of digital technology
4. Describe the historical context of current international rivalries
5. Identify the factors and characteristics of international competition in the Digital Age
6. Develop an understanding of techno-nationalism and techno-globalism

Overview

Study Unit 3 applies the themes of globalisation and technology and related issues to the contexts of the nation-state as well as of the nation-state in regional and international situations. The emergence and entrenchment of digital technologies in the twenty-first century has not only resulted in intra-national dislocations and pressures, they have also been used in either provoking or sustaining territorial conflicts and diplomatic tensions. National governments have responded to the multifaceted impact of digital technologies. They have been harnessing and developing its potential to strengthen its policies, e.g. Singapore's Smart Nation initiative, and to collaborate across national borders, e.g. the ASEAN Smart City Network (ASCN). At the same time, national governments have also introduced legislative measures to regulate Big Tech and to curb the excesses of its products. Topics in this Study Unit will facilitate discussion to better understand how various nations in the world, including Singapore, take steps to protect its national interests and to defend its sovereignty and territorial integrity in the Digital Age.

Lesson Recording

The Politics of Globalisation in the Digital Age

Chapter 1: The Nation-State in the Digital Age

Ever since the nation-state emerged from the political demise of former empires after the Second World War, it has been the defining political unit in world history. Despite repeated claims of its eventual demise, especially by advocates of globalisation who suggest, among other things, how digital technology can create a global village by rendering national boundaries meaningless, the nation-state remains prominent and relevant in these first decades of the twenty-first century. This chapter discusses the dynamics of the nation-state in the Digital Age, via an introductory overview of how nationalism spreads or is communicated, and from there, to discuss how the nation-state navigates and manages the impact of digital technologies.

1.1 Communicating Nationalism

Political scientist Benedict Anderson described the nation as an "imagined political community", because the "members of even the smallest nation will never know their fellow-members, meet them, or even hear of them, yet in the minds of each lives the image of their communion."[1] For example, an individual Singaporean may not know all other Singaporeans on the island, but he or she may still perceive certain similarities or find solidarity in how Singaporeans speak, behave or react in certain situations. These perceptions of similarities in turn form the basis of a sense of kinship, togetherness or solidarity, which becomes a basis of belonging, despite actual inequalities or exploitation within that community. This part of the chapter explores nationalism as a concept and how the idea of nationalism is transmitted or communicated.

[1] Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (London, UK: Verso, 2006), p. 6.

1.1.1 Nation, Nationalism and Sovereignty

Before proceeding further, Anderson's reflections on nationalism introduces certain approaches and concepts relevant for this course. First, nationalism is not a synonym for various types of ideologies, such as Liberalism or Fascism. He noted that it would be more productive to approach nationalism and the nation anthropologically,[2] that is to study how nationalism originated, its cultural roots and characteristics of the nation, how both "behaved" and developed over time. This approach allows for a more holistic and structural understanding of nation and nationalism, rather than unwittingly connecting those terms to specific ideologies.

Second, Anderson suggested that the nation is limited, that is the nation is finite and hence is distinct from other nations.[3] Throughout history, there have been various expressions of distinctiveness that resulted in new nation-states. For example, American colonists initiated the War of Independence in 1775 to break away from Great Britain – specifically from the British monarchy's attempt to impose greater economic control through taxes – and in doing so, created the United States of America. Similarly, the 1911 revolution led by Sun Yat Sen and other revolutionaries who were determined to replace the Qing dynasty with a republic (a political situation where power is not concentrated in a monarch, but held by the public and expressed through their elected representatives). Closer to home, the pioneering generation of nationalists in Singapore, their outlooks sharpened by the Japanese Occupation and global decolonisation, agitated for political independence from British imperialism, eventually attaining it in 1963 (when Singapore joined the Federation of Malaya to form Malaysia).

The above examples show expressions of political and economic differences. There are also social and cultural differences, such as ethnicity, language and religion, or even differences in how to manage those differences. For example, Singapore separated from Malaysia to become an independent nation-state in 1965, partly due to the divergence between

[2] Ibid., p. 4.

[3] Ibid., p. 6.

People's Action Party and the Barisan Nasional in how to manage Malaysia's multiracial society. The populations of nation-states in general are never homogenous, that is while they may see and present themselves as American, Chinese (in the political, not ethnic, sense) or Singaporean, they may be of different ethnicities and hold a diverse range of views and beliefs.

As such, the imagining of the nation must constantly be reiterated, not just to give meaning, structure and tangibility to the nation, but also to provide a platform for diverse outlooks to at least believe in a common vision. Here, state apparatus play an important role. For the purposes of this course, we can define a state as a polity that has clear territorial boundaries, managed by a government to ensure the integrity of those boundaries. Max Weber's classic definition of the state as a polity or organisation that has a monopoly on the legitimate use of force or violence,[4] has some relevance here. If we take a broader view of "force", that is as the power to enforce its will, we can understand the state as an entity or organisation that enforces laws, executes state policies and its related processes, e.g. collecting taxes, regulating the economy, maintaining law and order, or ensuring basic literacy in public schools.

Seen that way, state apparatus can and have been brought to bear with its tangible processes and structures, providing meaning and a sense of identity to the nation. For instance, serving National Service, considered as a rite of passage for Singaporean males and their supporting families, is an integral part of the Singaporean identity. Other more subtle but no less significant usage of state apparatus to reinforce national identity includes the annual National Day Parades, days set aside for commemoration such as Total Defence Day or Racial Harmony Day, or the regular singing of "Majulah Singapura" (Singapore's national anthem) and reciting of the national pledge in front of the national flag in schools. These are not unique to Singapore. The People's Republic of China also celebrates its National Day every year on 1 October and has a national

[4] Max Weber, "Politics as a Vocation", 1919. Originally rendered in German. English translation of lecture can be found here: https://web.archive.org/web/20130319092642/http://anthropos-lab.net/wp/wp-content/uploads/2011/12/Weber-Politics-as-a-Vocation.pdf

anthem, "March of the Volunteers" (义勇军进行曲: Yìyǒngjūn Jìnxíngqǔ), while the USA commemorates Independence Day every year on 4 July, usually reciting the pledge of allegiance and singing the anthem "Star Spangled Banner".

Third, Anderson noted that the nation is sovereign.[5] Taken on its own, the term "sovereign" usually refers to an individual or institution exercising legitimate or accepted authority over groups of people, usually within a territory. This concept evolved from the historical context of the wars of religion that afflicted sixteenth and seventeenth-century Europe, where being sovereign meant being free from the political and religious authority of the Catholic Church as well as the feudal lords the former supported. The wars ended with the Peace of Westphalia, referencing a series of treaties signed in 1648. Political scientists and scholars of international law have generally interpreted the treaties as the beginnings of the modern international system of states. One guiding principle of this system was the avoidance of interference in the internal affairs of other states or polities (ostensibly to allow the sovereign in those states and polities to exercise their authority). Also known as Westphalian sovereignty, this particular interpretation of sovereignty gained traction from the eighteenth century and it was enshrined in enshrined in Article 2 of the United Nations Charter.[6]

Anderson's use of "sovereign" and implicit understanding of sovereignty draws from this historical context, where sovereign means to be autonomous, self-determining, and ideally free from external interference in its internal affairs. Anderson suggested that the origins of nationalism could be attributed to responses against earlier imaginings or organisations of society that centred on religion and its leaders (such as the Catholic Pope), or on dynastic realms and their monarchs and offsprings – who themselves drew legitimacy to rule from religious divinity.[7] These older forms eventually lost out to

[5] Anderson, *Imagined Communities*, p. 6.

[6] See Article 2 in the *United Nations Charter, Chapter I: Purposes and Principles*: https://www.un.org/en/about-us/un-charter/chapter-1

[7] Anderson, *Imagined Communities*, p. 19.

national imaginations that, at their very core, imagined or envisioned a decentralisation of power and hence freedom from being subjected to the laws and norms enacted by a singular entity or individual.

This is especially useful when discussing the impact of digital technologies on the integrity of nation-states, especially how sovereignty has seemingly transferred from the nation-state or state, to the individual user of digital media. This then raises the interesting question of which is the bigger threat to the nation-state: the economic excesses of globalisation or the personalised use of digital technologies.

1.1.2 The Analogue Spread of Nationalism

In 2011, a series of uprisings erupted throughout the Arab world (North Africa and West Asia), threatening to topple the ruling regimes – in some cases successfully (in Tunisia and Egypt).[8] One prevailing perception is the supporting role of social media platforms, such as Facebook, Twitter and other communicative platforms, which not only enabled protesters to connect with other like-minded individuals, communicate covertly, and plan and execute their demonstrations; but also giving voice to the oppressed and disenfranchised and to reach out to the world. The actual impact of social media on the Arab Spring uprisings is contested.[9] Nevertheless, how social media has been perceived to spread information and mobilise opinion is a useful point of departure to understand the significance of communication in the spread of nationalism.

[8] Jeremy Bowen, Arab Spring: How the uprisings still echo, 10 years on. https://www.bbc.com/news/world-middle-east-56000950. See also Elfatih A. Abdel Salam, Review Article: The Arab spring: Its origins, evolution and consequences… four years on. *Intellectual Discourse*, 23:1 (2015) 119-139.

[9] Haythem Guesmi, The social media myth about the Arab Spring. https://www.aljazeera.com/opinions/2021/1/27/the-social-media-myth-about-the-arab-spring. See also Ekaterina Stepanova, The Role of Information Communication Technologies in the "Arab Spring": IMPLICATIONS BEYOND THE REGION. PONARS Eurasia Policy Memo No. 159, May 2011. http://pircenter.org/kosdata/page_doc/p2594_2.pdf

How did nationalistic ideas spread and how did those processes bring strangers together in the analogue pre-Digital Age? In his discussion of the origins of national consciousness, Anderson identified a historical interplay between a technology of communications (print), capitalism ("a system of production and productive relations") – both of which combined into something known as "print-capitalism", and quite critically, the emergence of print-language.[10] He noted that this historical interplay occurred against the backdrop of gradual historical shifts in societal and political attitudes caused by the Reformation and Enlightenment movements. The shifts included: (1) disagreeing that society "was naturally organised around and under high beings – monarchs who were persons apart from other human beings and who ruled by some form of … (divine) dispensation";[11] (2) gradually disbelieving that "particular script-language offered privileged access to ontological truth"[12] – in other words, knowledge can also be attained through vernacular languages; and (3) having a conception of temporality (or time) that allows for individual consciousness (and imagination).[13]

The printing press (invented by Johannes Gutenberg in c. 1440) and its subsequent widespread use, combined with the emergence of capitalism (which can be understood in the context of this course as mass production for profit), gave birth to "print-capitalism". In earlier times, print made visible and tangible what was otherwise seemingly unattainable or sacred. In doing so, it not only communicated information and news (through newspapers), but also encouraged imagination (through the novel).

For example, Martin Luther, a Germanic priest widely seen as the catalyst for the Reformation, printed his famed ninety-five theses in response to what he saw as the excesses of the Catholic Church during the sixteenth century. Within fifteen days of him nailing a printed copy of the theses to the chapel-door in Wittenberg in 1517, copies

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[10] Anderson, *Imagined Communities*, pp. 44-45.

[11] Ibid.

[12] Ibid.

[13] Ibid.

of the theses were apparently "seen in every part of the country".[14] The printed copies moreover were made more accessible as Luther printed the theses in the vernacular German language. This move enabled his ideas to reach out to the masses who could not read and speak Latin, the language used in scholarship, government administration and other formal situations in Europe at that point in time.

This brings us to "print-language". Print-languages are more than just a language to communicate information and ideas – they "laid the basis for national consciousness…" in three ways.[15] First, they created "unified fields of exchange and communication" between the official / elite languages and the diverse variety of spoken vernaculars. As such, print-languages are not only able to reach out to more than just the elite few using the former; they also create platforms for mutual understanding with a language that cuts across diversities and brings people together. Second, they lend a fixity to the language, which allowed information and ideas to be reproduced practically infinitely, not just from person to person, but also over time and geographical space.[16] In other words, ideas can escape their original time or geographical space through reprinting and translation. Third, in adopting a particular vernacular as the print-language, certain languages or dialects, such as English, French, German, Arabic, Mandarin or Malay, were elevated to a "new politico-cultural significance".[17] Many of these print-languages became and remain national languages for various countries in the worlds, or at the very least became closely associated with national identity.

Those used to electronic and digital mediums of communication may see print media as archaic. Nevertheless, the manner by which older communicative mediums transmit information remains relevant. Imagine the quickened pace of transmission, increased

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[14] Ibid., p. 39. Anderson cited this information from Lucien Febvre and Henri-Jean Martin, *The Coming of the Book: The Impact of Printing, 1450-1800* (Verso, 1997).

[15] Ibid., p. 44.

[16] Ibid., pp. 44-45.

[17] Ibid., 45

reach and greater impact as mass communication technologies evolved from print mediums. Franklin Delano Roosevelt, the thirty-second President of the United States of America, used the radio to good effect. He reached out to millions of Americans public with his "fireside chats" via the wireless radio – with the aim of informing the public of government actions, first regarding his New Deal policies and programmes to address the fallout of the 1930s Great Depression, and later to ease America's entry into the Second World War from December 1941.[18] Making the first live radio broadcast in 1924, King George V gave voice and tangibility not only to his role as King of the United Kingdom and British Dominions, but also as Emperor of British India.[19] His successor, King George VI, not only made important speeches via the radio (as depicted in the film *The King's Speech*), he also continued his father's tradition of broadcasting a radio message every Christmas, maintaining that personal connection to all British subjects. His granddaughter, Queen Elizabeth II, went a step further, allowing her coronation to be broadcast live on television in 1953. Indeed, we know more about her and her father through popular culture mediums, namely a television drama series (Netflix's *The Crown*)[20] and the feature film *The King's Speech*.

In Singapore, the late Lee Kuan Yew also made good use of the radio. In 1961, he delivered twelve radio broadcasts live, in three different languages (Mandarin, Malay and English), every other night for three weeks. In his own words, "There was no Internet and no social media then…. I chose the most effective medium available at the time to speak directly to the people. Radio could reach virtually every corner of the island through multi-

[18] Helmut Norpoth, "Fireside Leadership." In *Unsurpassed: The Popular Appeal of Franklin Roosevelt*. New York: Oxford University Press, 2018. Oxford Scholarship Online, 2018. doi: 10.1093/oso/9780190882747.003.0002.

[19] Edward Owens, A man we understand: King George V's radio broadcasts. In *The Family Firm: monarchy, mass media and the British public, 1932-53*, University of London, 2019, p. 91.

[20] See M. Merck, *The British Monarchy On Screen*. Manchester University Press, 2016.

lingual broadcasts. This was how most people got their news then."[21] Those speeches contributed to a referendum victory for the People's Action Party in 1962, paving the way for independence through merger with the Federation of Malaya to form Malaysia in 1963. Since then, radio and television have played important roles in supporting the Singaporean nation, be it through the playing of the national anthem at the beginning and end of the day's broadcast, or live telecasts of national events, such as the National Day Parade or the National Day Rally. Indeed, the much-used motion image of Lee Kuan Yew breaking down and asking for a break during the press conference announcing Singapore's separation from Malaysia on 9 August 1965 endures to this day and perhaps beyond, because television cameras captured the moment and digital technology has ensured it endures.

1.2 Imagining the Digital Nation-State

In 2021, Singapore went a step farther by live streaming its parliamentary sessions on social media platforms.[22] The minister-in-charge remarked, "If we do this, then I think we would have made a signal contribution to our nation building efforts, with a deep engagement of our citizens."[23] While the printed word, images, and sound and video recordings ensure specific moments are documented for posterity, they do not capture the immediacy of a live telecast or a live stream. This immediacy is further heightened by the personalised experiences offered by the Internet and social media platforms, such as YouTube, Facebook, Twitter, or Instagram. Compared to the shared experience of the radio and television – at least initially (think of family and friends gathering around to listen or to watch), the personal computer and its portable and more mobile devices

[21] See Foreword to Lee Kuan Yew, *The Battle for Merger* (Singapore: National Archives of Singapore; Straits Times Press, 2014).

[22] Chew Hui Min, Government agrees 'in principle' to livestream Parliament proceedings, MCI to study details, 4 Sept 2020. https://www.channelnewsasia.com/singapore/parliament-livestream-government-agrees-in-principle-iswaran-588771

[23] Ibid.

like the tablet and smart phone – coupled with social media platforms, offer a personal experience unparalleled in technological or even human history. In turn, this could raise questions about the impact of digital mediums on various aspects of the nation-state. If the nation-state is an imagined community, held together by commonalities, real or perceived, and supported by those analogue modes of communication discussed above, then what happens when those who do not believe in those commonalities and promote their ideas via the faster digital mediums of communication?

1.2.1 Digital Sovereignty vs National Integrity

Since the early years of the twenty-first century, especially with emergence of tech companies, concerns have been growing regarding privacy issues at the personal level as well as sovereignty issues at the nation-state level. In the context of this course, Big Tech collectively refers to tech companies specialising or engaging in e-commerce and related activities. There have been several acronyms referring to this companies, such as FAANG (Facebook, Amazon, Apple, Netflix and Google), BATX (Baidu, Aliababa, Tencent, and Xiaomi), or G-MAFIA (Google, Microsoft, Amazon, Facebook, IBM, and Apple,[24] and more recently (to accommodate Facebook's re-branding efforts, MAMAA (Meta, Amazon, Microsoft, Alphabet and Apple).[25]

Massive amounts of transactions take place on the digital platforms provided or inspired by these companies. In those transactions, terrabytes of personal information are made known, such as credit card information, email addresses, mailing addresses, and more significantly, our online behaviour, i.e. our posts, our likes, dislikes and follows, or the amount of time spent on particular websites. Such information about human behaviour

[24] Bruce Sterling, The Big Nine G-MAFIA BAT, 15 Mar 2019. https://www.wired.com/beyond-the-beyond/2019/03/big-nine-g-mafia-bat/.

[25] Marco Quiroz-Gutierrez, Not FAANG but MAMAA: Jim Cramer reveals new acronym for the 5 largest tech giant, 30 October 2022. https://fortune.com/2021/10/29/faang-mamaa-jim-cramer-tech-facebook-meta/

in the digital world becomes a basis for deeper levels of economic activity that can only be imagined previously.

Google's Chief Economist Hal Varian first outlined the potential of digital transactions or what he termed as computed mediated transactions in the second decade of the twenty-first century.[26] In discussing the impact of such transactions on economic activity, Varian shared examples that we may be familiar with or even wish for in making work and life more convenient. He suggested that computer mediated transactions and their more physical outcomes could very well enforce previously unenforceable contractual terms, e.g. installing a vehicular monitoring system in the vehicle to monitor and ensure safe driving, or even to ensure loan repayments are made on time by having the monitoring system prevent the car from starting. Advertisers can also move from the uncertainty of knowing whether radio listeners, TV viewers or newspaper readers seeing their ads, to date retrieved from online users directly clicking on their digital ads.[27] In his words, "Because transactions are now computer mediated, we can observe behavior that was previously unobservable and write contracts on it. This enables transactions that were simply not feasible before."[28]

Varian was speaking from the perspective of making businesses more cost-efficient, or perhaps more accurately, advocating for the actions of a tech business as a Chief Economist of Google (a post he held since 2002). At this current stage of the Digital Age, we have become more aware the fallout of indiscriminate monitoring of our online behaviour. This is due in no small part to the writings of Shoshana Zuboff, a Harvard professor of social pscychology, who examined the social implications of Varian's advocacy of computer

[26] See Hal R. Varian (2010). Computer Mediated Transactions. The American Economic Review, 100(2), 1–10. https://doi.org/10.1257/aer.100.2.1

[27] Hal Varian, (2014). Beyond Big Data. Business Economics. 49. 10.1057/be.2014.1. https://people.ischool.berkeley.edu/~hal/Papers/2013/BeyondBigDataPaperFINAL.pdf

[28] Ibid.

mediated transactions.[29] Zuboff notes Varian's examples could create a situation of "un-contracts", instead of creating a new, more observable contract between businesses and customers. She suggests that this "un-contract" transcends "the contract form by stripping away governance and the rule of law".[30] Interestingly, she also suggests that in addition to greater automation, information technology also "informates", i.e. the action of the automation produces information that can be used to make things more knowable. In her words, "This produces action linked to a reflexive voice, as computer-mediation symbolically renders events, objects, and processes that become visible, knowable, and shareable in a new way. This distinction … marks the difference between 'smart' and 'dumb'."[31]

Zuboff expanded her initial arguments in her book, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*.[32] Surveillance capitalism, according to Zuboff, "unilaterally claims human experience as free raw material for translation into behavioral data".[33] In other words, the data that we willingly or unwittingly share when using digital platforms are extracted or harvested for profit, like older forms of capital, e.g. natural resources, land or labour. Zuboff accepts that while some information is necessary to make improvements to the product or service, other information are however "fed into advanced manufacturing processes known as "machine intelligence", and fabricated into prediction products that anticipate what you will do now, soon, and later."[34] In this context of this course, algorithms are a type of "machine intelligence" mentioned by Zuboff, i.e. automated and "smart" processes to informate (so to speak) so as to anticipate or even guide our future behaviours, be it to buy a product or to spend more time on a digital

[29] Shoshana Zuboff, (2015). Big other: Surveillance Capitalism and the Prospects of an Information Civilization. Journal of Information Technology, 30(1), 75–89. https://doi.org/10.1057/jit.2015.5

[30] Ibid.

[31] Ibid.

[32] Ibid.

[33] Shoshana Zuboff, *The Age of Surveillance Capitalism* (New York: PublicAffairs, 2019), p. 8.

[34] Ibid.

platform. Algorithms, simply put, are sets of instructions, rendered in computer code, to accomplish particular outcomes or to conduct particular tasks, similar to a cooking recipe. But these simple instructions are originally created by humans, and if not adjusted to account for changes, retain our biases and blindspots that inadvertently become the basis for filter bubbles and echo chambers.

Therefore, and this is a key plank of Zuboff's arguments, surveillance capitalism undermines individual sovereignty, i.e. the right of an individual to choose his or her own future, and in doing so, undermines democracy as well.[35] Her passionate arguments to safe-keep individual sovereignty in this Digital Age are perhaps the basis for the concept of digital sovereignty, i.e. "the ability to have control over your own digital destiny – the data, hardware and software that you rely on and create."[36]

There have been instances to support Zuboff's position where the integrity of the political systems of entire nations have been threatened. The prime example remains the Cambridge Analytica scandal, the scale of which was known only after a whistleblower went to the press in 2018.[37] Cambridge Analytica was a consulting firm that used an app, "This is Your Digital Life", to harvest the personal data of individuals using Facebook as well as that of their online friends.[38] The personal data, notably the political preferences

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[35] Charissa Yong, US Capitol riot: How social media helped enable attack by die-hard Trump fans , 8 Jan 2021, https://www.straitstimes.com/world/united-states/how-social-media-helped-enable-the-storming-of-the-us-capitol

[36] Sean Fleming, What is digital sovereignty and why is Europe so interested in it? 15 March 2021. https://www.weforum.org/agenda/2021/03/europe-digital-sovereignty/

[37] Julia Carrie Wong, The Cambridge Analytica scandal changed the world – but it didn't change Facebook, 18 Mar 2019, https://www.theguardian.com/technology/2019/mar/17/the-cambridge-analytica-scandal-changed-the-world-but-it-didnt-change-facebook; Alvin Chiang, The Facebook and Cambridge Analytica scandal, explained with a simple diagram, 2 May 2018 (last updated) https://www.vox.com/policy-and-politics/2018/3/23/17151916/facebook-cambridge-analytica-trump-diagram

[38] Timothy Revell, How Facebook let a friend pass my data to Cambridge Analytica, 16 April 2018. https://www.newscientist.com/article/2166435-how-facebook-let-a-friend-pass-my-

of Facebook users, was then used to try to influence national elections and political campaigns, notably the 2016 US Presidential Election that Donald Trump eventually won and the 2016 Brexit referendum. The storming of the US Capitol in January 2021 is one tangible and unfortunate outcome of the digital excesses of Trump's "Twitter Presidency", which simultaneously drove and was driven by online support, eventually culminating in a mob attack on one of America's physical monuments to its democratic system.[39]

The integrity of nations can also be affected in other ways. Digital platforms have given a voice to those who otherwise not be heard or understood in the pre-Digital Age. This could be due to deliberate suppression or outlawing of extremist beliefs and ideologies, such as Nazism and its present-day variants or race supremacists, many of which have been behind the emergence (or re-emergence) of extreme right-wing political and social thought in Western democracies such as the United States and the United Kingdom. By the same token, digital platforms also offer an avenue to be heard and be part of the nation or society they work and live in, e.g. minorities (be it racial, gender, sexual or other categories), the social and economic disenfranchised, and individuals and groups whose voices and opinions could have been unintentionally or otherwise marginalised. Both ways have been enabled so to speak by the personal nature of these digital platforms, which in turn threatens (one more overtly than the other) the unifying logics and hence the sovereignty of the nation.

The issue for us to ponder on is this: in the context of the nation-state and the Digital Age, how can we understand the tension between individual needs and preferences (amplified by digital platforms), and the unifying logic of collective that is the nation-state? If

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data-to-cambridge-analytica/; and Revealed: Aleksandr Kogan collected Facebook users' direct messages https://www.theguardian.com/uk-news/2018/apr/13/revealed-aleksandr-kogan-collected-facebook-users-direct-messages

[39] Dmitriy Khavin, Haley Willis, Evan Hill, Natalie Reneau, Drew Jordan, Cora Engelbrecht, Christiaan Triebert, Stella Cooper, Malachy Browne and David Botti, Day of Rage: How Trump Supporters Took the U.S. Capitol, 30 June 2021. https://www.nytimes.com/video/us/politics/100000007606996/capitol-riot-trump-supporters.html

Anderson is correct, that the nation is an imagined community (buttressed moreover by state apparatus and communication technologies), what happens to the nation when diverse and disparate voices start to question a particular imagining that has been taken as the norm all this while? The following sub-section deals with some of the responses by governments around the world, but we also have to think on how our responses, actions and decisions as individuals (either as citizens of a country or a member of online community that spans globally), also impact thinking and discourse on this matter.

1.2.2 Digital Governance, Smart Nations

Governments have responded in a variety of ways to the implications of Digital Age, especially if they feel the integrity of the nation they run and protect is at stake. For the purposes of this course, we can group their responses in three ways: regulation through legislation (and related processes), harnessing technologies as part of national development and identity, and ad hoc responses to emergencies such as the Covid-19 pandemic.

As a collective, Big Tech has come under increasing pressure from governments around the world. In many ways, governments are transferring that pressure from their constituents to Big Tech, as the latter becomes more aware of the excesses of Big Tech's economic activities via their digital platforms. On 29 July 2020, the US Congress House Judiciary Antitrust Subcommittee questioned extensively the Chief Executive Officers (CEO) of Alphabet, Meta (then Facebook), Apple and Amazon. Subcommittee members also confronted the CEOs with examples of antitrust, even bullying, behaviour towards their competitors (some of which were smaller businesses using Big Tech platforms). Since then, the US Department of Justice have initiated antitrust suits against those Big Tech companies, ostensibly to curb their monopolistic behaviour.[40] (The lawsuits are

[40] Adi Robertson, Everything you need to know from the tech antitrust hearing Apple, Google, Facebook, and Amazon versus Congress, 29 Jul 2020. https://www.theverge.com/2020/7/29/21335706/antitrust-hearing-highlights-facebook-google-amazon-apple-congress-testimony; Roger McNamee, A historic antitrust hearing in Congress has put big tech on notice, 30 Jul

ongoing at the time of completing this Study Guide).[41] Following another whistleblower's revelations about Facebook and Instagram's harmful effects on children and youths, congressional hearings have also been initiated, in particular questioning the head of Instagram in December 2021.[42] While there have been rumblings about breaking up Big Tech, e.g. reversing Facebook's acquisitions of Whatsapp and Instagram, progress has been noticeably slow since the initial hearings in mid-2020, leading questions as to the effectiveness of government oversight.[43]

Perhaps the American approach, anchored by its democratic, checks-and-balances tenets, appear ineffective only by comparison to the actions taken by their counterparts in the People's Republic of China (PRC). Since 2006, the PRC has erected what is popularly known as the "Great Firewall of China", partly to protect fledging tech sector from the late 1990s but still continues to this day in restricting the activities of non-PRC digital platforms and tech firms. Since late 2020, the PRC government has been tightening its control over the Chinese Big Tech firms. Indeed, one could trace the intensification of government oversight to a speech Jack Ma, co-founder of Alibaba Group, made in October

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2020. https://www.theguardian.com/commentisfree/2020/jul/31/big-tech-house-historic-antitrust-hearing-times-have-changed. See also the official recordings and documents in Hearings Online Platforms and Market Power, Part 6: Examining the Dominance of Amazon, Apple, Facebook, and Google. https://judiciary.house.gov/calendar/eventsingle.aspx?EventID=3113

[41] See also official press statements by the Department of Justice and Federal Trade Commission: https://www.justice.gov/opa/pr/justice-department-sues-monopolist-google-violating-antitrust-laws and https://www.ftc.gov/news-events/press-releases/2020/12/ftc-sues-facebook-illegal-monopolization.

[42] The Straits Times, Instagram chief pressed by US lawmakers over kids' mental health, 9 Dec 2021. https://www.straitstimes.com/world/united-states/instagram-chief-pressed-by-us-lawmakers-over-kids-mental-health. See also Dan Milmo, How losing a friend to misinformation drove Facebook whistleblower, 4 Oct 2021. https://www.theguardian.com/technology/2021/oct/04/how-friend-lost-to-misinformation-drove-facebook-whistleblower-frances-haugen

[43] Cecilia Kang, Congress, Far From 'a Series of Tubes,' Is Still Nowhere Near Reining In Tech, 11 Dec 2021, https://www.nytimes.com/2021/12/11/business/congress-tech-regulation.htmlhttps://fortune.com/2021/12/09/instagram-congress-hearing-social-media/

2020 that among other things criticised the outdated banking system (and hence indirectly the PRC government).[44] After that speech, the proposed Ant Group IPO was cancelled and Ma dropped out from public view for more than three months. Not long after, Alibaba was fined a record $2.8 billion for antitrust activities by the PRC's State Administration of Market Regulation (SAMR), which also took to task and fined another thirty-four tech firms in early 2021.[45] At the same time, the Cyberspace Administration of China (CAC) cracked down on ride-hailing app, Didi, and other similar apps and platforms for possible data security breaches, ostensibly to protect the consumer but also to protect national interests.[46] The PRC government has also taken action to manage the excesses of what it saw as "disorderly capital expansion", namely by cracking down on media and gaming (e.g. curfews for minors in accessing Bytedance and Tencent platforms and games), and the banning of for-profit tutoring.[47] As of late 2021, the PRC government's approach is only intensifying.

Singapore's approach is useful perhaps as a comparison, or as a combination of what we could see as the two extremes of the American and Chinese approach to regulating Big Tech. In 2019, the Singaporean government introduced the Protection from Online Falsehoods and Manipulation Act (POFMA), which was preceded an eight-day parliamentary subcommittee hearing which took testimonies and evidence from close to 100 individuals and organisations.[48] This law grants the government to respond to what it perceives as fake news and to compel digital platforms and individuals to

[44] Kevin Xu, English translation of Jack Ma's Bund Finance Summit Speech. 9 Nov 2020. https://interconnected.blog/jack-ma-bund-finance-summit-speech/.

[45] Chang Che and Jeremy Goldkorn China's 'Big Tech crackdown': A guide, 2 August 2021, https://supchina.com/2021/08/02/chinas-big-tech-crackdown-a-guide/

[46] Ibid.

[47] Ibid.

[48] POFMA Office, Regulations: Protection from Online Falsehoods and Manipulation Act (POFMA) https://www.pofmaoffice.gov.sg/regulations/protection-from-online-falsehoods-and-manipulation-act/

take down the offending information. In 2021, POFMA was complemented by FICA, or the Foreign Interference (Countermeasures) Act, where government is empowered to prosecute individuals or organisations suspected of conducting hostile information campaigns. Internet Service Providers (ISP) and owners of online platforms may be compelled to block content suspected of deliberate disinformation as part of the hostile information campaign.[49] Singapore's approach takes aspects from those of America and China, i.e. in holding public hearings on the matter, passing legislation to empower authorities to act, and as and where deemed necessary, to take direct action.

It is not however all draconian stick and no acknowledgement of how digital technologies and advancement in technologies can be helpful for everyday living and work as well as to bolster national identity. In 2014, the Singaporean government launched the Smart Nation initiative. The Smart Nation initiative is supported by three pillars: Digital Society, Digital Economy, and Digital Government, all of which is move towards the objective of "harness technology to effect transformation in health, transport, urban living, government services and businesses."[50] Singapore's Smart Nation initiative draws from the Smart City concept, which is "a framework, predominantly composed of Information and Communication Technologies (ICT), to develop, deploy, and promote sustainable development practices to address growing urbanization challenges."[51] In other words, to harness and deploy ICT approaches to resolve issues arising from increasing urbanisation, e.g. connectivity between work, play and everyday living, environmental impact from commercial and residential development, or social and economic implications from city-

[49] Rei Kurohi, 5 things to know about Fica, the law to counter foreign interference, 5 Oct 2021, https://www.straitstimes.com/singapore/politics/5-things-to-know-about-fica-the-law-to-counter-foreign-interference

[50] Smart Nation Singapore, Home Page, https://www.smartnation.gov.sg/

[51] Thales Group. Secure, sustainable smart cities and the IoT, https://www.thalesgroup.com/en/markets/digital-identity-and-security/iot/inspired/smart-cities

living.[52] Notwithstanding the very real issues Singapore's society and economy face (e.g. aging population, falling birthrates, immigration policies and regular restructuring of the economy),[53] Singapore's Smart Nation initiative arguably takes the Smart City concept a step further by connecting the nation's progress and identity to its ability to harness technology effectively. This is perhaps to fit the essence of techno-nationalism, as described by David Edgerton, as Singapore appears to assume that "the key unit of analysis for the study of technology is the nation: nations are the units that innovate, that have R&D budgets and cultures of innovation, that diffuse and use technology".[54] We will relook this concept and its counterpart techno-globalism in the next chapter in the context of international competition and conflict.

Singapore has gone beyond its national borders in its drive to harness digital technologies. When Singapore held the ASEAN Chairmanship in 2018, its representatives helped establish the ASEAN Smart Cities Network (ASCN), which started with twenty-six cites from ASEAN member states. The concept note highlighted a variety of issues arising from rapid urban development and that "technological and digital solutions can be utilised to resolve these issues and to enhance quality and accessibility of services, thereby improving our citizens' lives across the urban-rural continuum, creating new opportunities for them and helping ensure that no one is left behind."[55] Singapore also hosted the inaugural

[52] For further reading, see TWI Global, WHAT IS A SMART CITY? – DEFINITION AND EXAMPLES, https://www.twi-global.com/technical-knowledge/faqs/what-is-a-smart-city#HistoryofSmartCities, and Amy Glasmeiera and Susan Christopherson, Thinking about smart cities. *Cambridge Journal of Regions, Economy and Society* 2015, 8, 3–12. doi:10.1093/cjres/rsu034. https://dusp.mit.edu/sites/dusp.mit.edu/files/attachments/publications/Smart%20Cities%20CJRES%20021415.pdf

[53] Smart Nation Singapore. Strategic National Projects, https://www.smartnation.gov.sg/initiatives/strategic-national-projects

[54] David E.H. Edgerton, The Contradictions of Techno-Nationalism and Techno-Globalism: A Historical Perspective. *New Global Studies* 2007, 1, 1.

[55] Concept Note. ASEAN Smart Cities. https://asean.org/wp-content/uploads/2018/04/Concept-Note-of-the-ASEAN-Smart-Cities-Network.pdf

ASCN workshop and meeting in the same year, which produced and adopted Smart City Action Plans (SCAP) and the ASEAN Smart Cities Framework (ASCF).[56] The former lists by city the projects to be undertaken (Singapore's initial stated projects were on e-payments and National Digital Identity),[57] while the latter outlines a roadmap to achieve the three broad strategic ASCN outcomes, which are Competitive Economy, Sustainable Environment, and High Quality of Life.[58]

Crises and emergencies also drives technological innovation, if only out of sheer necessity. During the Covid-19 pandemic, we have seen and experienced first-hand the utility and at times the limits of digital technologies. The pandemic has inexorably forced even the most Luddite of Luddites to adapt in order to continue studying, working, living and the simple act of staying in touch with family and friends. The Smart Nation website devotes an entire section to Singapore's use of technology to manage the fallout of the Covid-19 pandemic. This ranges from facilitating TraceTogether contact tracing to communicating stay-home notices, close contact warnings and vaccination notices, from provision of information on where to retrieve test kits, masks and SafeEntry tokens, as well as information for businesses and social support.[59] For close to two years (and perhaps for a while to come), people in Singapore as well as in the rest of the world have become intimately acquainted with the intricacies of Zoom, Google Meet, Microsoft Teams, and other similar video-conferencing platforms in order to continue studying or working. People in Singapore have come to expect to show their vaccination status via their TraceTogether digital app when entering malls, eateries, offices or public attractions. Questions we can ponder in

[56] ASEAN. ASEAN Smart Cities Network (ASCN). https://asean.org/our-communities/asean-smart-cities-network/ (Note: Link may not be working at times).

[57] ASEAN. ASEAN Smart Cities Network: Smart City Action Plans. https://asean.org/wp-content/uploads/2019/02/ASCN-Consolidated-SCAPs.pdf

[58] ASEAN. ASEAN Smart Cities Network Framework. https://asean.org/wp-content/uploads/2019/02/ASCN-ASEAN-Smart-Cities-Framework.pdf

[59] See sub-sections in Smart Nation Singapore. Combating Covid-19. https://www.smartnation.gov.sg/covid-19/covid-19-tech

class include: what other technological innovations or adaptations that have emerged because of the Covid-19 pandemic? How many of those were due to state interventions or funding, and vice versa, how many of those came about from non-state funding / individual initiative?

Chapter 2: International Politics in the Digital Age

In this chapter, we will survey historical international rivalries and the role of technology in those, and then bring the discussion to contemporary times to understand present-day and perhaps future international competition, its nature and implications as it unfolds in the Digital Age. We will also discuss two concepts, techno-nationalism and techno-globalism, and trace its historical development and implications for the Digital Age.

2.1 Historical International Rivalries

Our world has witnessed and recorded several significant international rivalries, most significantly the two World Wars and the ensuing Cold War between the United States of Americas (and its affiliates) and the Soviet Union (and its affiliates). From a historical perspective, one could trace a deep-lying source of these rivalries to a period of time when Europeans traversed, explored and then dominated the world. This roughly began from the time Christopher Columbus crossed the Atlantic Ocean and "discovered" the Americas in 1492 (in his bid to find another route to Asia). Spanish and Portuguese explorations followed soon after, colonising the areas known today as the Caribbean and South America. Throughout the seventeenth century (i.e. the 1600s), the British established the original thirteen colonies in North America, the basis for the present-day United States of America. From the eighteenth century onwards, the British established settler colonies in Africa, South Asia, Oceania (present-day Australia and New Zealand) and the Pacific Islands.[60]

Closer to Singapore and Southeast Asia, the Portuguese was the first European nation to make its mark in the region by capturing Melaka in 1511 (and in the process, altering the course of Malay-world history). Not long after, the Spanish colonised the archipelagic territory known today as the Philippines from 1565. The Dutch established

[60] Information taken from Jerry H. Bentley and Herbert F. Zeigler, *Traditions and Encounters: A Global Perspective from the Past. Volume II: From 1500 to the Present*. McGraw Hill, 2008.

their presence in present-day Indonesia from 1610, via their Vereenigde Oostindische Compagnie (translated as the United East India Company, or more colloquially known as the VOC). Together with the British East India Company (EIC), these two joint-stock companies were the potent symbol of mercantile capitalism.[61] In competing with VOC for control of the lucrative spice and China trades, the British first established trading posts in Penang and Singapore and from that base, extended their influence over the Malay Peninsula (present-day western Malaysia).

Driven in no small part by competition and rivalry between the European nations, exploration and settlement intensified from the nineteenth century onwards, evolving into outright annexation of territories and imposition of European culture and beliefs. By the 1800s, the British, the Dutch and the Spanish were seen as the older, more traditional powers by newer nations like France, Germany and Italy. By the early twentieth century, the world was divided between these European powers, with the British Empire being the largest. The European domination of the world was moreover made possible in no small part by technological advancements and adaptation, supported by industrial might, and quite critically the willpower to use such technologies to pacify or subjugate others. These technologies notably include steam power (which made travel faster and less dependent on nature), telegraphy (to keep in touch with far-flung ends of empire), and the advancements made by the Industrial Revolution (which drove demand and the search for raw materials to manufacture various products for profit).

This historical preamble is to set the context for what was to come. European exploration and colonisation since the time of Columbus had brought the world closer together so to speak. So much so that when a Bosnian Serb assassinated the heir to the Austri-Hungary Empire in 1914 (and started the First World War), it was not just Europe engulfed in war, but also its colonies and their peoples. The Second World War, fought between the Allied Powers (led by USA, the United Kingdom and the Soviet Union) and the Axis Powers

[61] For a brief overview, see Hans Derks, A Tale of Two Global Corporations, *Global Journal*, 14 Nov 2019 | Volume 12 | Issue 50. https://globalejournal.org/global-e/november-2019/tale-two-global-corporations

(led Germany, Italy and Japan), was even more encompassing in its global scale. What began as a conflict in the European continent expanded throughout the world as Nazi Germany and its allies expanded the war into northern Africa and the Soviet Union. The Nazi's Asian ally, Imperial Japan, attacked Pearl Harbour, occupied all of Southeast Asia, and even invaded the eastern regions of British India. The Second World War was truly a global conflict that affected most parts of the world between 1939 and 1945.

How the Pacific part of the war ended is also relevant to this course's focus on technology, and to some extent, is a suitable segue-way into one of the key characteristics of the ensuing Cold War. The two atomic bombs, nicknamed Fat Man and Little Boy, dropped on Japan in August 1945 not only hastened the end of the Second World War, it also marked the first (and only known) time nuclear weapons were deliberately deployed in war. Technologically speaking, the atomic bomb marked a terrifying advancement from using hundreds of bomber planes unleashing thousands of bombs, to only needing one plane and one bomb to accomplish devastation beyond the initial impact (such as cancer and radiation illnesses).

The two atomic bombs were the mere prelude to the nuclear arms race between the USA and the Soviet Union, which was a key characteristic of the Cold War (roughly from 1945 to the break-up of the Soviet Union in 1991). The original atomic bombs were the products of nuclear fission, i.e. the splitting of the atom nucleus to produce massive amounts of energy. By the 1950s, the superpowers were testing hydrogen or thermonuclear bombs, which were products of either nuclear fusion (i.e. harnessing the energies from the fusing of lighter elements into heavier elements), or a combination of the fission and fusion processes. Delivery of nuclear weapons also evolved from bomber planes to intercontinental ballistic missiles, to some extent reducing the risk to those delivering the weapons. By the 1960s, the term Mutually Assured Destruction or MAD was coined, referencing the stalemate between the two superpowers because of their abilities to destroy each other and the world via its nuclear arsenal. As such, the idea of MAD can be understood as a deterrent against nuclear war. One perhaps more benign or inspiring consequence of the nuclear arms race was the space race that occurred

simultaneously. The Soviets had stolen a march on the Americans by the early 1960s, being the first to send animals and humans into space and safely bring them home. The Americans would have the final say though, by being the first to send humans to the moon in 1969.

The bipolar world dominated by the two superpowers, allied organisations (namely the North Atlantic Treaty Organisation for the USA, and the Warsaw Pact for the Soviet Union) and other satellite states, dissolved with the break-up of the Soviet Union in 1991. Following that, the world arguably became multipolar, i.e. various nation-states of more or less equal economic and military strength and political influence.

2.2 International Competition in the Digital Age

International competition in the past have technological undertones, e.g. from sail to steam power, the advent and delivery of nuclear weapons, or sending humans into space and safely bringing them home. The implications and complexities of the Digital Age add another dimension to international competition, i.e. the management and weaponisation of information flows, especially in the context of multinational corporations in an increasingly networked world when national interests still hold sway.

In January 2018, then President Donald Trump announced the introduction of import tariffs on solar panels and washing machines, the opening salvo of a trade or tariffs war with the People's Republic of China (PRC). Before the year's end, the USA imposed more tariffs on Chinese imports and the PRC had retaliated in kind, imposing tariffs on American sorghum and other American products including aluminium waste and scrap, pork, fruit and nuts.[62] Such economic actions are not novel, having been used throughout history, mainly to protect fledgling domestic industries (as America did at various points

[62] Andrew Mullen, Explainer | US-China trade war timeline: key dates and events since July 2018, 29 Aug 2021, https://www.scmp.com/economy/china-economy/article/3146489/us-china-trade-war-timeline-key-dates-and-events-july-2018

in its history),[63] or to maintain a superior economic position (as the British once did to maintain its imperial possessions).

This trade conflict however took on a different dimension in 2019, when the American government added Huawei and its affiliates on a trade blacklist, preventing them from purchasing parts and components from US companies without prior approval from the US government.[64] This was done in the name of America's national security, as Huawei was closely connected to the PRC government and military, and hence was long suspected of intellectual property theft as well as espionage.[65] This moreover happened on the backdrop of the detention of Meng Wanzhou, Huawei's Chief Financial Officer (who's also the daughter of Huawei's CEO) in Canada in December 2018, and the subsequent attempt to extradite her to the United States to face charges for breaking US sanctions by selling equipment to Iran.[66] China retaliated by detaining two Canadian citizens in the same month.[67] This situation was only resolved in September 2021 when a deal was reached with the US government. Upon returning to China, Meng received what amounted to a hero's welcome. As reported, China's state media portrayed her return as "a sign of a strong, resilient country and a diplomatic victory for Beijing." The American side also

[63] Ian Fletcher, America Was Founded as a Protectionist Nation, 25 May 2011 (latest version), https://www.huffpost.com/entry/america-was-founded-as-a_b_713521

[64] WATARU SUZUKI, Five things to know about the US 'blacklist' on Huawei, 17 May 2019, https://asia.nikkei.com/Economy/Trade-war/Five-things-to-know-about-the-US-blacklist-on-Huawei

[65] See Jordan Robertson and Jamie Tarabay, Chinese Spies Accused of Using Huawei in Secret Australia Telecom Hack, 17 December 2021, https://www.bloomberg.com/news/articles/2021-12-16/chinese-spies-accused-of-using-huawei-in-secret-australian-telecom-hack, and Colin Lecher and Russell Brandom, Is Huawei a Security Threat? Seven Experts Weigh In, 17 Mar 2019, https://www.theverge.com/2019/3/17/18264283/huawei-security-threat-experts-china-spying-5g

[66] See Moira Warburton, Key events in Huawei CFO Meng Wanzhou's extradition case, 25 Sept 2021, https://www.reuters.com/technology/key-events-huawei-cfo-meng-wanzhous-extradition-case-2021-08-11/

[67] Ibid.

claimed a victory of sorts, with the Department of Justice stating that Meng "admitted" to misleading a banking institution in order to do business with Iran.

We see in the brief example above expressions of nationalism, expressed via economic sanctions, (attempts at) criminal persecutions, as well as claims of victory or justice served. The latter expressions are perhaps more significant against the backdrop of continuing tensions between the two biggest economies in the world, with GDPs of over twenty and eighteen billion dollars (USD) for the USA and China respectively (as at February 2021).[68]

Of interest here to this part of the course are the suspicions surrounding Huawei's alleged espionage on behalf of the PRC government. Spying, intelligence gathering, counter-intelligence operations (which include disinformation campaigns) are ages-old human activities in the attempt to stay informed to stay a step ahead of your enemies and even your friends. The possibilities offered by digital technologies, such as speed and accessibility to information and to share information, can arguably intensify such activities. Hence, governments around the world have closely scrutinised Huawei's business operations, e.g. building "backdoors" in their telecom hard- and software to gather data, and have taken action when necessary, e.g. Huawei banned from the United Kingdom's 5G network.[69]

In the wake of the Cambridge Analytica scandal, where online users' personal data were gathered and then manipulated to achieve desired political objectives, concerns by governments around the world are understandable. Indeed, concerns could be more pronounced in light of disinformation campaigns and other similar cyberwarfare waged by certain nations. For instance, other than being accused of interfering into the Brexit Referendum and the US Presidential Elections, Russia is also suspected of conducting

[68] Research FDI, THE TOP 20 LARGEST ECONOMIES IN THE WORLD BY GDP, 8 Feb 2021, https://researchfdi.com/world-gdp-largest-economy/

[69] Joe Panettieri, Huawei: Banned and Permitted In Which Countries? List and FAQ, 28 Nov 2021, https://www.channele2e.com/business/enterprise/huawei-banned-in-which-countries/

cyberwarfare against Ukraine as part of the Russia-Ukraine War (started in 2014) to destablise the Ukrainian government and military.[70]

State-sponsored hacking is a significant characteristic of international competition in the Digital Age. Singapore was not spared either, with multiple hacking attempts reported on various government and government-linked agencies. The most prominent cyberattack took place in 2018, when SingHealth's database was successfully hacked, allowing access to the personal details of over 1.5 million patients, such as National Registration Identity Card (NRIC) numbers, addresses, birthdates and related information. This cyberattack was significant as it appeared that Prime Minister Lee Hsien Loong's personal information was specifically targeted.[71] It was later reported that the incident was perpetuated by state-sponsored hackers, but the suspected states or nations were not specified. This incident was sufficiently serious to pause Smart Nation initiatives at that point in time, by then about four years in progress. Indeed, earlier in 2016, about 100,000 government laptops and personal computers were "de-linked" from the Internet as a response to unspecified security concerns.[72] Set against the context of Singapore's ambitions to harness technology for national development (with the unspoken objective of ensuring Singapore remains viable as an entity by staying ahead of its competitors), the government of Singapore cannot afford to take lightly the threats posed by state-sponsored hacking and similar cyberwarfare.

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[70] See for instance, Bill Gertz, Inside the Ring: Cybercom's Michael Rogers confirms Russia conducted cyberattacks against Ukraine, 12 Mar 2014, https://www.washingtontimes.com/news/2014/mar/12/inside-the-ring-cybercoms-michael-rogers-confirms-/; and Dustin Volz, U.S. government concludes cyber attack caused Ukraine power outage, 26 Feb 2016. https://www.reuters.com/article/us-ukraine-cybersecurity-idUSKCN0VY30K. Those interested in further reading can read this online resource: Cyber War in Perspective: Russian Aggression against Ukraine.

[71] Irene Tham, Personal info of 1.5m SingHealth patients, including PM Lee, stolen in Singapore's worst cyber attack, 20 Jul 2018, https://www.straitstimes.com/singapore/personal-info-of-15m-singhealth-patients-including-pm-lee-stolen-in-singapores-most

[72] Irene Tham, Security risks prompted Government to cut Internet access: Analysts, 9 Jun 2016, https://www.straitstimes.com/tech/security-risks-prompted-government-to-cut-internet-access-analysts

2.3 Techno-Nationalism and Techno-Globalism

With that in mind, it may be useful to end Study Unit 3 with a short discussion of two concepts, techno-nationalism and techno-globalism, to help us better understand the themes and topics outlined above, and from there, how else can we understand and present the issues discussed in this Study Unit and this course overall to others. In general, concepts are useful devices to help us organise our thoughts regarding particular issues or questions. But we must also be aware that concepts have a history of their own and may not universally applicable. In other words, concepts are formulated or created within a particular context, they have an original meaning specific to that particular context, and we must be aware that their original meaning can evolve with continuous usage over time.

The first concept is techno-nationalism, an abbreviated version perhaps of technological nationalism. David Edgerton, a historian of science, observes that this term assumes "the key unit of analysis for the study of technology is the nation: nations are the units that innovate, that have R&D budgets and cultures of innovation, that diffuse and use technology".[73] In other words, the nation is the principal driver for technological innovation, providing funds, creating the workspaces and culture, and is responsible for the spread and utilisation of technology. Edgarton cautions us such a situation appears to be so because the concept originated and evolved in the context of nations seeking to differentiate themselves by claiming ownership (for the lack of a better word) over technological innovations and key innovators, or technological supremacy over others.[74] Such an approach makes several assumptions, including "national economic and technological performance is determined by national rates of innovation", that rich nations have an obligation to innovate to keep ahead of poorer nations, and hence, that Research & Development funding (preferably led by the government) becomes a key

[73] David E.H. Edgerton, The Contradictions of Techno-Nationalism and Techno-Globalism: A Historical Perspective. *New Global Studies* 2007, 1, 1.

[74] Ibid.

indicator of an innovative nation and economic growth.[75] Edgarton suggests that these assumptions are contrarian to historical evidence, i.e. that economic growth does not always correlate to R&D budgets and that technological innovation are not bounded by national boundaries and indeed are transferred across territories throughout history.[76]

Let us try to apply the techno-nationalism concept, using the brief outline above, to Singapore. At first glance, it does appear that Singapore's Smart Nation initiative as well as Singapore's leading role in the ASEAN Smart City Network are expressions of techno-nationalism. In other words, Singapore's government is taking the lead in spearheading R&D in various Smart Nation projects, and from public statements on the initiative, there also appears to be direct correlation between those and Singapore's economic growth and national identity. Going further, an interesting question arises, especially regarding the point of technological sharing (or transfers of expertise and equipment across technological borders): while the broad goals and strategies are clear enough in the Smart Nation website, the website does not immediately indicate the individuals or organisations responsible for leading these projects and their technological innovations. One could reasonably assume that the relevant government agencies are responsible for those.

But, and purely as a thought exercise, if we understand Singapore in its context of limited resources (including people), one would reasonably assume that Singapore needs to train and/or import skills, expertise and relevant equipment (hardware and software) to ensure the Smart Nation initiatives remain on track. From there, one could also begin to become more aware of the broader connections and impact of the initiative. For example, on the nation's policies on migration (who to allow in for work; space for housing and leisure; public opinion), education (what kind of training to provide, not only for students but also teachers), and economic development (development of industries to provide jobs for graduates). The broader point of this thought exercise is demonstrate one (rather

[75] Ibid., 8.

[76] Ibid., 8-9.

rudimentary) way of applying a concept to an actual example, not merely to prove the concept right or wrong, but to test the limits on different contexts and situations. For instance (and again, purely as a thought exercise – and feel free to reframe the question when reflecting on it): if Singapore is transferring or importing technological expertise to support its Smart Nation initiative, can we still describe the initiative as techno-nationalism?

The second concept Edgerton discusses is techno-globalism, a term not often used, but its implications and assumptions can be observed in studies of technology vis-à-vis the world in general. Edgerton identifies several issues with those assumptions. The first is that such studies are usually innovation-centric, and hence, cannot be global (because technological innovations usually emerge from particular local contexts) – but the authors of such studies do "make claims for the relationship between technology and the process of globalisation".[77] The second is that such studies, focused on innovation as they are, do not give sufficient weight to the productivity of relatively poorer nations. Instead, their "innovation-centric techno-globalism" focus more on technologies of communication (such as the Internet), especially their role in making irrelevant the nation-state and creating a global village.[78] A third issue is that techno-globalist accounts rely on "historical amnesia". Edgerton shares the example of Henry Ford forgetting the role of the steamship, railway and telegraph in bringing the world closer together, in his attempt to praise the car, airplane and the wireless (radio).[79]

To contrast with the last example, Edgerton pulled out the cynical view of George Orwell, who wrote in 1944, "Actually, the effect of modern inventions has been to increase nationalism, to make travel enormously more difficult, to cut down the means of communication between one country and another, and to make various parts of the world

[77] Ibid., 10.

[78] Ibid., 10.

[79] Ibid., 11.

less, not more dependent on one another for food and manufactured goods."[80] Edgerton went on to suggest that the techno-globalist histories of the airplane and the radio, in eulogising their globalising tendencies, "forget" their very nationalist or local origins and purpose. For instance, histories of aviation, to Edgerton, are largely of civil aviation, despite its militaristic origins. In sum, techno-globalist narratives "it very seriously mistimes and mistakes the impact of the key technologies of global communication".[81]

The rest of Edgerton's article develops with examples his opening conceptual discussion, which you can read for further discussion with your course-mates in class. The immediate objective in outlining the above is to provide a sufficient empirical basis from which we can begin to apply the concept in various situations, for instance to identify techno-globalist narratives, or aspects of it, when we read articles, books, news reports / opinion-editorials, public statements by government spokespersons or Big Tech CEOs on topics concerning technology and innovation. As the on-going international conflicts ramble on in this Digital Age, especially tensions between China and the United States, there will be more opinions and analysis reports written, much of it will use the above concepts and others to put across their argument or position.[82]

[80] Ibid., 12. Citing Orwell, As I Please, Tribune 12 May 1944.

[81] Ibid., 14.

[82] See for example Graham Webster and Justin Sherman, The Fall and Rise of Techno-Globalism: Democracies Should Not Let the Dream of the Open Internet Die, 28 Oct 2021 https://www.foreignaffairs.com/articles/world/2021-10-28/fall-and-rise-techno-globalism; and Efekan Bilgin and Alphonse Loh, Techno-nationalism: China's bid for global technological leadership, 28 Sept 2021, https://blogs.lse.ac.uk/cff/2021/09/28/techno-nationalism-chinas-bid-for-global-technological-leadership/.

Activity 3.1

Do you think the following quotes are or include expressions of techno-gobalism? Pen down your reasons why or why not, with examples. (If possible, read the original document for context).

> Hillary Clinton: "Now, ultimately, this issue isn't just about information freedom; it is about what kind of world we want and what kind of world we will inhabit. It's about whether we live on a planet with one internet, one global community, and a common body of knowledge that benefits and unites us all, or a fragmented planet in which access to information and opportunity is dependent on where you live and the whims of censors."[83]
>
> The White House (Obama Administration): "The free flow of information depends on interoperability—a principle affirmed by 174 nations in the Tunis Commitment of the World Summit on the Information Society. The alternative to global openness and interoperability is a fragmented Internet where large swaths of the world's population would be denied access to sophisticated applications and rich content because of a few nations' political interests."[84]

[83] Hillary Clinton, Remarks on Internet Freedom, 21 Jan 2010, https://2009-2017.state.gov/secretary/20092013clinton/rm/2010/01/135519.htm

[84] The White House, International Strategy for Cyberspace: Prosperity, Security, and Openness in a Networked World, May 2011, https://nsarchive.gwu.edu/document/21442-document-46

Summary

This Study Unit discusses some of the implications for nation-states in this Digital Age. It discusses some of the ways a nation imagines and reiterates itself, from historical modes of communication to more recent digital versions, which are also utilised by the State to ensure a certain vision of the nation. We must also be aware that digital mediums of communication can also cut the other way, i.e. undermine the logic and integrity of the nation-state, by providing voices to dissenting voices who may not always believe in the commonly held vision of the nation. The business rationale and approach of the so-called Big Tech companies (both American and PRC versions) also demonstrate that individuals, communities and nations could have given up more than they bargained for, in return for more convenience, efficiency, and/or higher standard of living. Some of these tensions have made their way into the international arena, where the key characteristics of globalisation (e.g. movement and exchanges of goods, services, ideas and labour) become weaponised this Digital Age. Digital technologies have advanced earlier forms of espionage, to a point where hostile neighbours could initiate disinformation campaigns to undermine local societies and economies. At this point of writing, there are several potential flashpoints in the world, e.g. Russia and Ukraine, the USA and the PRC, and more information will be written and published at a quicker pace. It is hence imperative, as the final section of the second chapter of this Study Unit attempts to do, to analyse critically the information and concepts we consume or are fed on a regular basis.

Formative Assessment

1. Which of the following best describes Benedict Anderson's understanding of the nation?
    a. An imagined political community
    b. A country with clear territorial boundaries.
    c. A spiritual principle
    d. A community that has a common print-language

2. According to Benedict Anderson, which of the following are characteristics of a nation?
    a. A nation is limited, sovereign, and its nationalism is based on a political ideology.
    b. A nation is unlimited, dependent on others, and based on a political ideology.
    c. A nation is based on state-like structures.
    d. A nation is limited, sovereign, and not necessarily based on a political ideology.

3. Which of the following is the best description of print-language?
    a. A type of language only found on print documents
    b. A type of language that creates a unified field of exchange and communication between official and vernacular languages, is fixed and hence transferable, and is usually a vernacular language elevated into politico-cultural significance.
    c. A type of language that is only found in the languages Benedict Anderson discussed.
    d. A type of language that is based on Latin.

4. Which of the following best describes the State as outlined in this Study Unit?
    a. The State refers to a government or governing authority, e.g. a monarch.
    b. The State refers to an area or territory with clear boundaries.

c. The State refers to an entity or organisation that enforces laws, executes policies and its related processes, actions that in turn give visibility and meaning to the structures and processes of the State.

d. The State refers to an entity or organisation that has a monopoly on the use of force to enforce laws and execute policies.

5. Which of the following best describes Shoshana Zuboff's understanding of surveillance capitalism?

a. Surveillance capitalism refers to understanding surveillance equipment and methods as capital.

b. Surveillance capitalism is a type of social ideology that advocates for greater surveillance of human activities to ensure law and order.

c. Surveillance capitalism is a political-economic ideology practiced by the CEOs of Big Tech to ensure profits and sustainability of their companies.

d. Surveillance capitalism unilaterally claims human experience as free raw material for translation into behavioural data. In other words, the data that we willingly or unwittingly share while using digital platforms are harvested for profit, like older forms of capital, e.g. natural resources, land or labour

6. According the Study Unit, Singapore's Smart Nation initiative can be understood as the most recent/current phase of nation-building.

a. True

b. False

7. As discussed in the Study Unit, which of the following is the best description of digital sovereignty?

a. Digital sovereignty refers to the ability to have control over your own digital destiny – the data, hardware and software that you rely on and create.

b. Digital sovereignty refers to the ability to have full control over our mobile devices.

c. Digital sovereignty refers to the ability to create digital devices at will.
d. Digital sovereignty refers to an independent Smart Nation, i.e. a nation driven by smart digital technologies.

8. Which of the following best describes the term "informate", as introduced by Shoshana Zuboff?
    a. Informate is a consequence of automation or automated processes.
    b. Informate is a concept derived from computer-mediated transactions.
    c. Informate refers to informants informing on others.
    d. Informate is a concept derived from information technology. It refers to information drawn from automation, which in turn makes automation and related processes knowable.

9. According to David Edgerton, nations are the principal drivers of technological research and development.
    a. True
    b. False

10. According to David Edgerton, which of the following are assumptions of tech-globalism?
    a. Innovation-centric, insufficient weight given to productivity of poorer nations, and historical amnesia.
    b. Productivity-centric, technological advancements in peripheral nations are noted, and historical amnesia.
    c. Innovation-centric, technological advancements in peripheral nations are noted, and historical amnesia.
    d. Productivity-centric, technological advancements in peripheral nations are noted, and situated in proper historical context.

Solutions or Suggested Answers

Formative Assessment

1. Which of the following best describes Benedict Anderson's understanding of the nation?

    a. An imagined political community

    Correct. Anderson called the nation an imagined political community because a key characteristic is how people who may not know each other could still imagine themselves as part of the same community.

    b. A country with clear territorial boundaries.

    Incorrect. Anderson's approach expands on this rudimentary understanding of what a nation could be.

    c. A spiritual principle

    Incorrect. This understanding of a nation is attributed to French historian, Ernest Renan, who first discussed the nation in detail in 1882.

    d. A community that has a common print-language

    Incorrect. As described by Anderson, print-language is merely one way of imagining the nation via communication of ideas and beliefs.

2. According to Benedict Anderson, which of the following are characteristics of a nation?

    a. A nation is limited, sovereign, and its nationalism is based on a political ideology.

    Incorrect. Anderson did state that a nation is limited and sovereign, but nationalism should not be seen as a synonym for a political ideology.

b. A nation is unlimited, dependent on others, and based on a political ideology.

Incorrect. Anderson stated that a nation is seen as limited and sovereign.

c. A nation is based on state-like structures.

Incorrect. See explanation in correct answer.

d. A nation is limited, sovereign, and not necessarily based on a political ideology.

Correct. Other than being limited and sovereign, Anderson cautions against likening nationalism to any political ideologies. He noted that it would be more productive to approach nationalism and the nation anthropologically, that is to study how nationalism originated, its cultural roots and characteristics of the nation, how both "behaved" and developed over time.

3. Which of the following is the best description of print-language?

a. A type of language only found on print documents

Incorrect. Print-language can be found in other mediums of communication.

b. A type of language that creates a unified field of exchange and communication between official and vernacular languages, is fixed and hence transferable, and is usually a vernacular language elevated into politico-cultural significance.

Correct. These are the key characteristics of any print-language as discussed by Benedict Anderson.

c. A type of language that is only found in the languages Benedict Anderson discussed.

Incorrect. Any language has the potential to be a print-language.

d. A type of language that is based on Latin.

Incorrect. Any language has the potential to be a print-language.

4. Which of the following best describes the State as outlined in this Study Unit?

a. The State refers to a government or governing authority, e.g. a monarch.

Incorrect (in the context of this course). This is one conventional interpretation of the concept. While the essence or idea of governance or administration has some relevance, understanding the State as a government or governing authority is indirectly relevant to how the State is applied and understood in SCO104.

b. The State refers to an area or territory with clear boundaries.

Incorrect (in the context of this course). While this is one conventional interpretation of the concept, it is not immediately relevant to how the State is applied and understood in SCO104.

c. The State refers to an entity or organisation that enforces laws, executes policies and its related processes, actions that in turn give visibility and meaning to the structures and processes of the State.

Correct. This understanding provides a basis to appreciate how the State (and its various apparatus) supports imaginings of the Nation through policies and processes, such as laws, education, community outreach or commemorative events.

d. The State refers to an entity or organisation that has a monopoly on the use of force to enforce laws and execute policies.

Incorrect. This understanding adapts Max Weber's classic definition of the State and needs a broader definition of the term 'force' to apply to this part of SCO104.

5. Which of the following best describes Shoshana Zuboff's understanding of surveillance capitalism?

    a. Surveillance capitalism refers to understanding surveillance equipment and methods as capital.

    Incorrect.

    b. Surveillance capitalism is a type of social ideology that advocates for greater surveillance of human activities to ensure law and order.

    Incorrect. Zuboff argues surveillance capitalism undermines individual sovereignty and democracy, but surveillance capitalism is described more as an economic process with social implications.

    c. Surveillance capitalism is a political-economic ideology practiced by the CEOs of Big Tech to ensure profits and sustainability of their companies.

    Incorrect. Big Tech companies do practice a form of surveillance capitalism, but it is not necessarily an ideology per se.

    d. Surveillance capitalism unilaterally claims human experience as free raw material for translation into behavioural data. In other words, the data that we willingly or unwittingly share while using digital platforms are harvested for profit, like older forms of capital, e.g. natural resources, land or labour

    Correct. As understood by Zuboff, surveillance capitalism profits from the capitalisation of human preferences.

6. According the Study Unit, Singapore's Smart Nation initiative can be understood as the most recent/current phase of nation-building.

    a. True

    Correct. The stated objective of the Smart Nation Initiative is to transform Singapore's society, economy and government through technology. This

builds on the smart City concept, which generally refers to the use of technology to resolve urban issues in a sustainable manner, by connecting the use of technology to the progress and development of Singapore as a nation-state.

b. False

Incorrect. See above explanation

7. As discussed in the Study Unit, which of the following is the best description of digital sovereignty?

a. Digital sovereignty refers to the ability to have control over your own digital destiny – the data, hardware and software that you rely on and create.

Correct. This generally refers to individuals, organisations as well as countries ensuring they retain autonomous control over the digital tools and products they use and/or create. The issue of digital sovereignty becomes more significant in the wake of the excesses of Big Tech's business approach.

b. Digital sovereignty refers to the ability to have full control over our mobile devices.

Incorrect. See explanation above.

c. Digital sovereignty refers to the ability to create digital devices at will.

Incorrect. See explanation above.

d. Digital sovereignty refers to an independent Smart Nation, i.e. a nation driven by smart digital technologies.

Incorrect. See explanation above.

8. Which of the following best describes the term "informate", as introduced by Shoshana Zuboff?

    a. Informate is a consequence of automation or automated processes.

    Incorrect. While automation produces information, "informate-ing" does not occur until we collect, analyse and apply the information.

    b. Informate is a concept derived from computer-mediated transactions.

    Incorrect. This is partly accurate as Zuboff coined the term in response to Hal Varian's advocacy of computer-mediated transactions.

    c. Informate refers to informants informing on others.

    Incorrect.

    d. Informate is a concept derived from information technology. It refers to information drawn from automation, which in turn makes automation and related processes knowable.

    Correct. Informate is a term coined by Shoshana Zuboff in an article discussing the social implications of computer-mediated transactions. She observed that the "informate" aspect of digital-era automation is what differentiates "smart" from "dumb".

9. According to David Edgerton, nations are the principal drivers of technological research and development.

    a. True

    Incorrect. Nations are a relatively recent concept and technological developments historically originated from more local entities.

    b. False

    Correct. Edgerton argues otherwise, that the basis of techno-nationalism, i.e. that nations are the principal drivers of technological progress, is

false, and that technological progress can come from various origins, e.g. individuals, communities as well as countries.

10. According to David Edgerton, which of the following are assumptions of tech-globalism?

    a. Innovation-centric, insufficient weight given to productivity of poorer nations, and historical amnesia.

       Correct. Edgerton argues that many studies of technology are based on these assumptions, which could and have misrepresented historical trajectories of certain technological innovations, such as the militaristic origins of several technologies such as the airplane and the radio. They could also downplay the contributions of individuals living in the peripheral nations of the world.

    b. Productivity-centric, technological advancements in peripheral nations are noted, and historical amnesia.

       Incorrect. See explanation in correct answer.

    c. Innovation-centric, technological advancements in peripheral nations are noted, and historical amnesia.

       Incorrect. See explanation in correct answer.

    d. Productivity-centric, technological advancements in peripheral nations are noted, and situated in proper historical context.

       Incorrect. See explanation in correct answer.

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