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The National Academies of
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CONSENSUS STUDY REPORT

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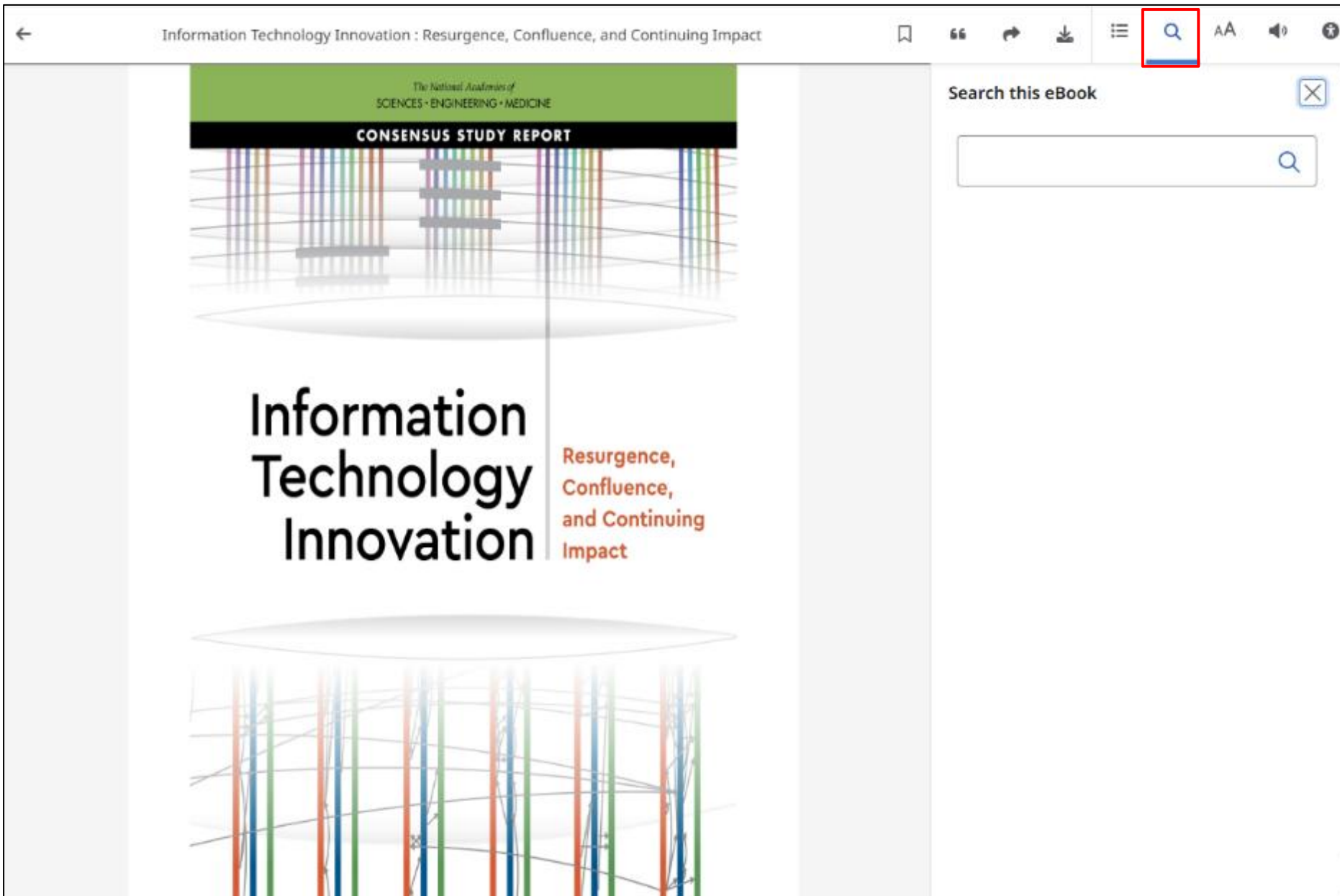
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Systems, Architecture	Manage increasingly complex computers, storage devices, and distributed systems and	Smartphones, cloud, personal computing, microprocessors	Over 3 billion smartphones worldwide; cloud services; Web and search technologies; enterprise data

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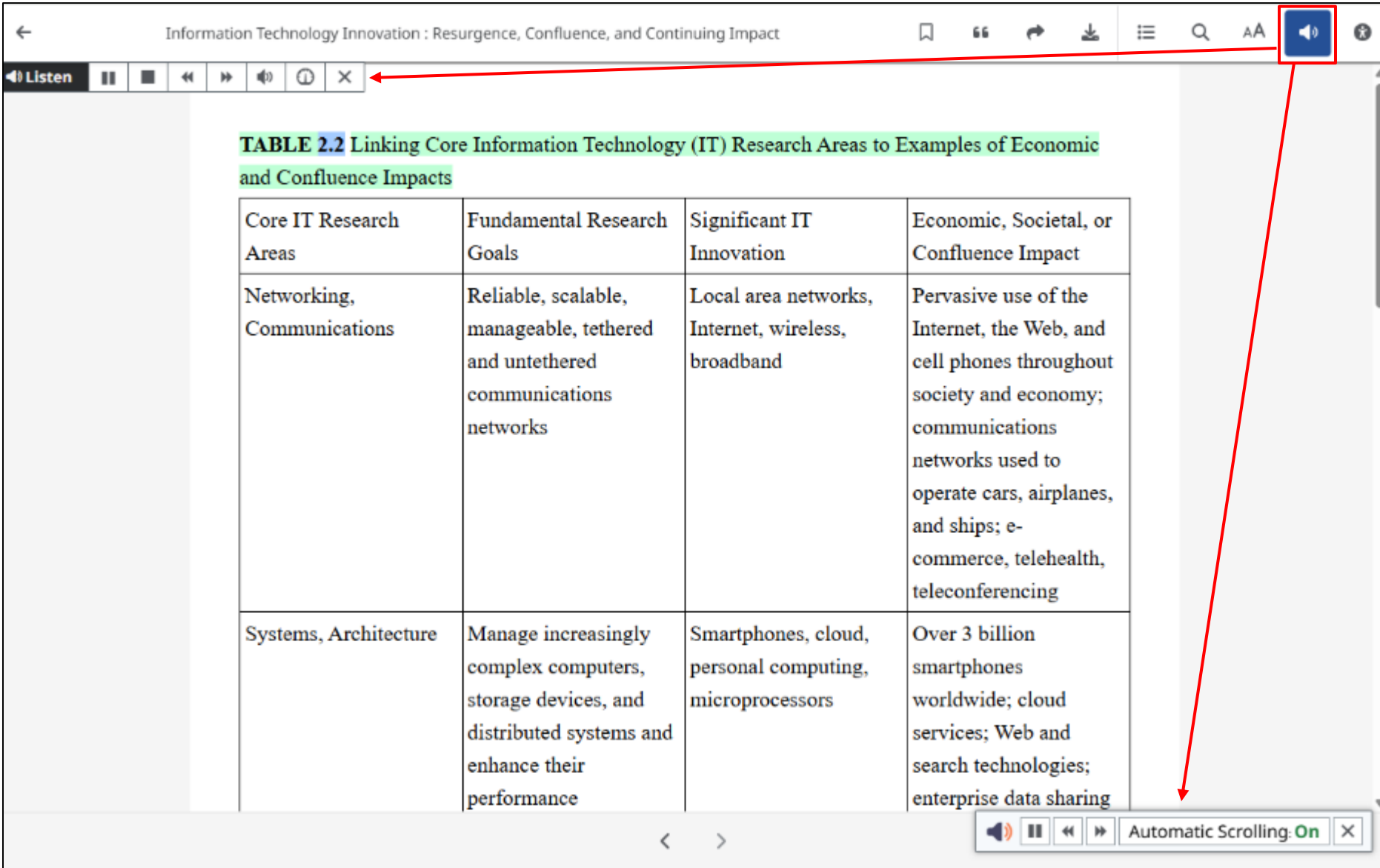
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TABLE 2.2 Linking Core Information Technology (IT) Research Areas to Examples of Economic and Confluence Impacts

Core IT Research Areas	Fundamental Research Goals	Significant IT Innovation	Economic, Societal, or Confluence Impact
Networking, Communications	Reliable, scalable, manageable, tethered and untethered communications networks	Local area networks, Internet, wireless, broadband	Pervasive use of the Internet, the Web, and cell phones throughout society and economy; communications networks used to operate cars, airplanes, and ships; e-commerce, telehealth, teleconferencing
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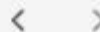
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Furthermore, synergies among research areas often lead to surprising results and have impacts that were not originally intended or envisioned. This characteristic of technological innovation is most evident in the broad-based impact of computing research. Such research often starts as a search for fundamental knowledge, but time and again produces practical technologies that enable significant economic impact (Table 2.2). Moreover, these tracks also depict the impact of complementary use-inspired research stemming from increasing amounts of deep interdisciplinary collaboration between computing and other areas of science (e.g., psychology in human-computer interaction) and industry (e.g., health care making use of and helping advance many IT innovations).

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Theory, Programming Languages	More effectively create software; understand the nature of computation and apply that understanding to create more efficient methods	Scalable, dependable, and agile software	Pervasive use of optimization, digital reconstruction, DNA sequencing, cryptocurrencies, and blockchain
Databases, Analytics	Manage, discover, locate, and analyze information	Enterprise software and systems	Widespread use of data sharing or data warehouses; precision medicine, electronic health records; precision farming

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