

Appendix 3A

The mission of the security of our nation and that of our allies: Critical technologies in this domain are those that can make a large present or future contribution to the effectiveness of offensive and defensive weapon systems, and improve situational awareness, communication, coordination, and intelligence. While some of these technologies are unique to national security applications, many are “dual use.” For years this has given rise to export controls, under which international sales of technologies that have both civilian and military applications are forbidden or restricted. Balancing the conflicting objectives of protecting access to technology that is critical for national security but also for economic well-being has been a long-standing policy challenge. For example, over a decade ago, export controls prevented US firms from exporting financial and banking IT systems that contained high-quality encryption. This resulted in European firms, which had access to similar dual use technology, gaining a substantial comparative advantage over US domestic firms.

The mission of US economic well-being: Critical technologies in this domain are those that play the most central role in producing and sustaining a strong GDP, contributing to high labor productivity, and assuring a strong present and future US comparative advantage in global markets. Also critical is making sure that the supply chains that enable such technologies are robust. For example, today it is apparent that microelectronics (chips) are central to economic prosperity. However, assessing in advance which technologies are, or will be, critical to future economic prosperity and comparative advantage can be very challenging. For example, office automation and computer-based word processing existed for several decades before their contributions to productivity became apparent in economic assessments.¹

The mission of US social well-being: Obviously a strong and growing economy, with high levels of employment, is important to social well-being. However, that alone is not sufficient to assure a high level of social well-being. Also important are technologies that are critical to assuring social equity and opportunity, wide and affordable access to quality education, and high levels of public health. One of the most compelling recent examples of a critical technology in the domain of social well-being is the advanced understanding in biotechnology that made it possible to rapidly develop mRNA-based vaccines to combat the SARS-CoV-2 pandemic.

¹ As Robert Solow (1987) memorably highlighted in his statement that one could “see the computer age everywhere, except the productivity statistics.”