

Report Part Title: FINAL OBSERVATIONS

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In an ever more connected and complex world, fostering a more diversified portfolio of cooperation partners and cooperation forms has become a strategic imperative for NDOs. The scope of these modern cooperation networks transcends far beyond the traditional alliances with likewise organizations.

Richard Nelson, an eminent professor of economics at Columbia University in New York, differentiates between what he calls “physical” – e.g. steel, energy, etc. – and “social” technologies – e.g. institutions, forms of cooperation, etc. Most major societal advances result from the evolutionary interplay between physical and social technologies.²⁷¹ One of Nelson’s important insights is that our societies’ “ability to develop effective social technologies is more limited and more prone to frustration than [their] ability to advance physical technologies.”²⁷² It took many decades before the physical technological breakthroughs that irrupted into our societies and gave rise to the industrial revolution engendered new social technologies such as factories, private firms, the concept of ‘division of labor’ etc. Early steam engines were already pumping water out of coal mines and coking coals were already being used to melt iron in the early 18th century – but the consolidation of these efforts into ‘factories’ only started happening in the second half of that century.²⁷³ The emergence of the modern firm – often in close cooperation with that other major emerging social technology, the modern state – also occurred in this very same period. Great Britain was the first country to stumble upon the right balance between physical and social technologies in this case. It was able to parlay this ingenuity into global dominance for over a century. A similar trend could also be observed in the military realm, where those nations that were able to decipher the new social technological codes that were embedded in industrial-age physical technological breakthroughs gained an enormous operational and strategic advantage over those that were not.

As was the case with the transition from the agricultural to the industrial age, physical technologies seem to once again run ahead of social technologies. The, so far still mostly physical, ICT revolution brings dramatic change to many areas of public and private life. Snowballing nano-, bio-, info-, and cogno- revolutions²⁷⁴ may very well soon start accelerating the pace and scope of this change even more. Changes in these physical technologies are occurring much more quickly than in any previous age, and there are good reasons to believe that they are likely to accelerate even more – especially if they start building on each other.²⁷⁵ It is important to point out that the information-heavy nature of these ongoing revolutions differs quite markedly from the information-light nature of the physical technologies that engendered the industrial revolution.²⁷⁶

The industrial age ended up being very different from any of the previous ages. The machines, capital investments, training requirements, even the mindset of the industrial age all required mass. Every sphere of public and private activity witnessed a sizeable expansion in scope. The mostly small pre- and proto-industrial economic agents mushroomed into factories. Many smaller pre-Westphalian geopolitical entities matured into nation-states. Also in the defense world, the scope of military units, organizations, operations, etc. witnessed major increases in size. The massive NDOs as we witness them today came into being.

It remains as of yet unclear to what extent mass will prevail in the post-industrial age. We currently still see massive post-industrial behemoths such as Google, Apple, or Microsoft taking advantage of their economies of scale and scope to creep into the top-50 of the largest companies.²⁷⁷ Are they the heirs of an industrial revolution based on mass that will be able to leverage their first-mover advantages into new, dominant (but probably still differently so) global behemoths? Or will the future be dominated by the new types of more distributed, peer-to-peer organizational forms based on different business models that we have described in this report – such as open source software in areas such as web servers (Apache), operating systems (Linux), etc.; such as peer-to-peer sharing initiatives such as Airbnb, Uber, Kiva etc.; or maybe even new manufacturing initiatives such as 3D fablabs and Etsy?

Irrespective of which type of organizational principle will end up generating most value, it seems virtually inconceivable that all of these new physical technological breakthroughs will not lead to dramatic new forms of social technologies – of which some of the examples we sketched here may be early precursors. It may be useful to emphasize that the participants in some of these new forms of cooperation are not

just some bit-players in marginal sectors. The pharmaceutical sector, such as the defense sector, is a massive capital-intensive industry with an extremely globalized and sophisticated value chain in which R&D plays a critical role. The fact that it has opened itself (selectively) to new forms of cooperation is quite telling. NDOs would therefore be well advised to open up their organization and be prepared – and more so, actively search – for unexpected new ways and partners for working better together.

