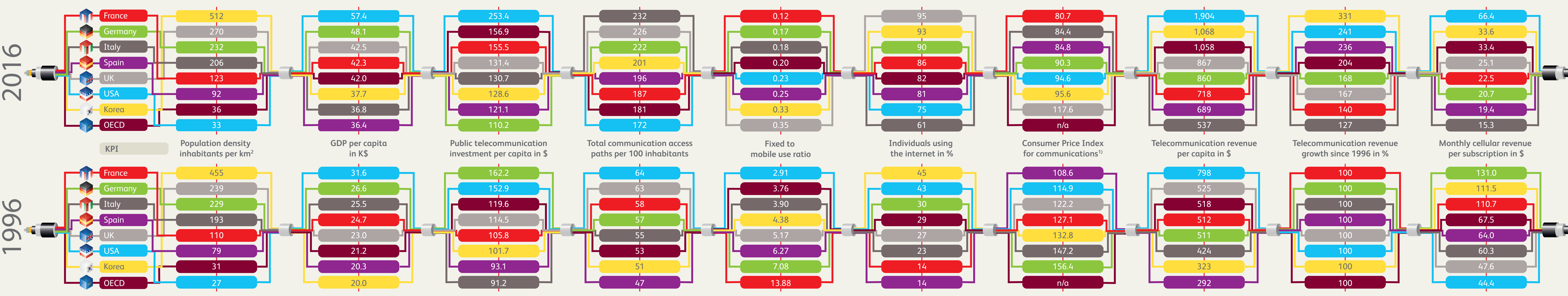


20+ years of liberalization of telecommunication markets

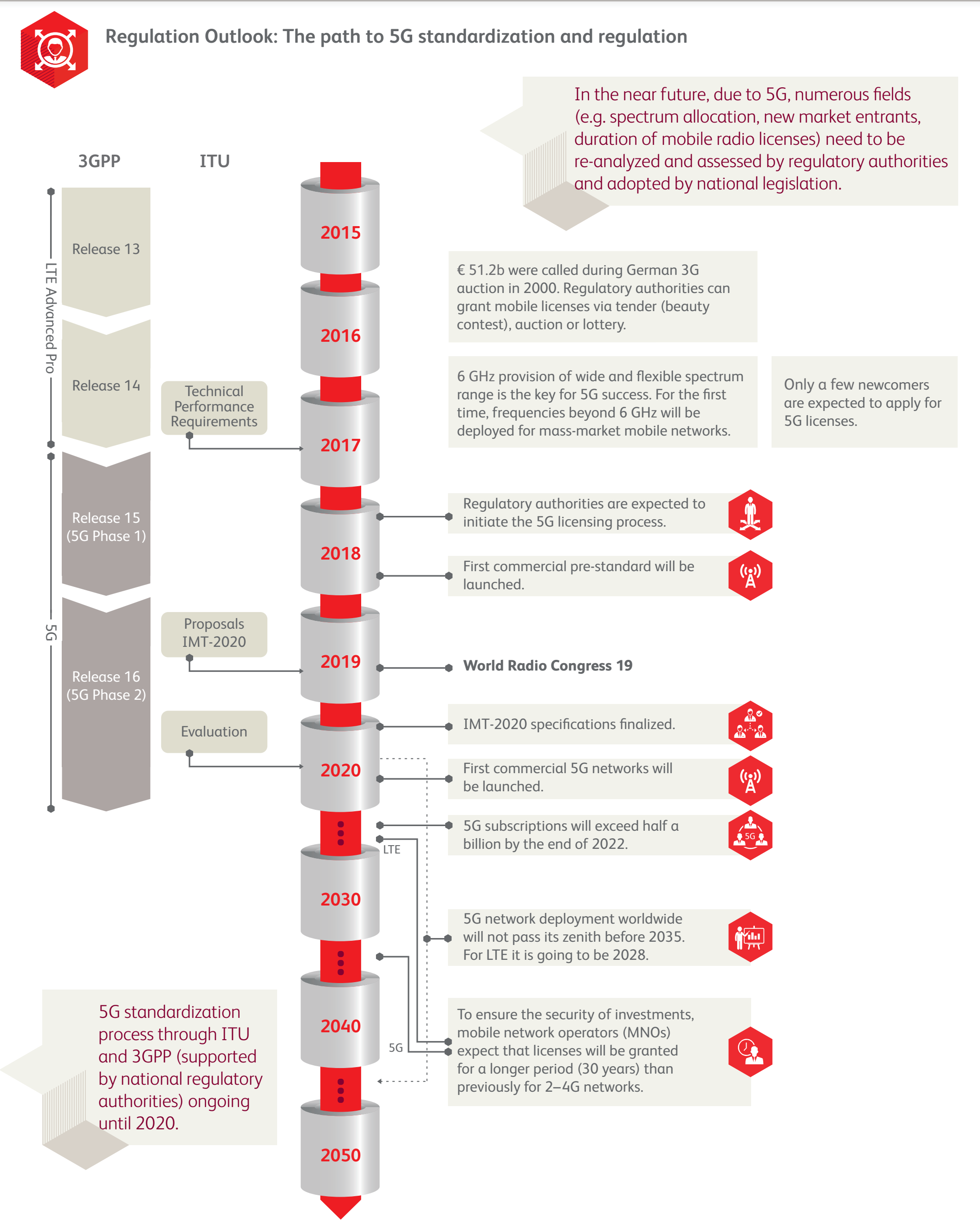
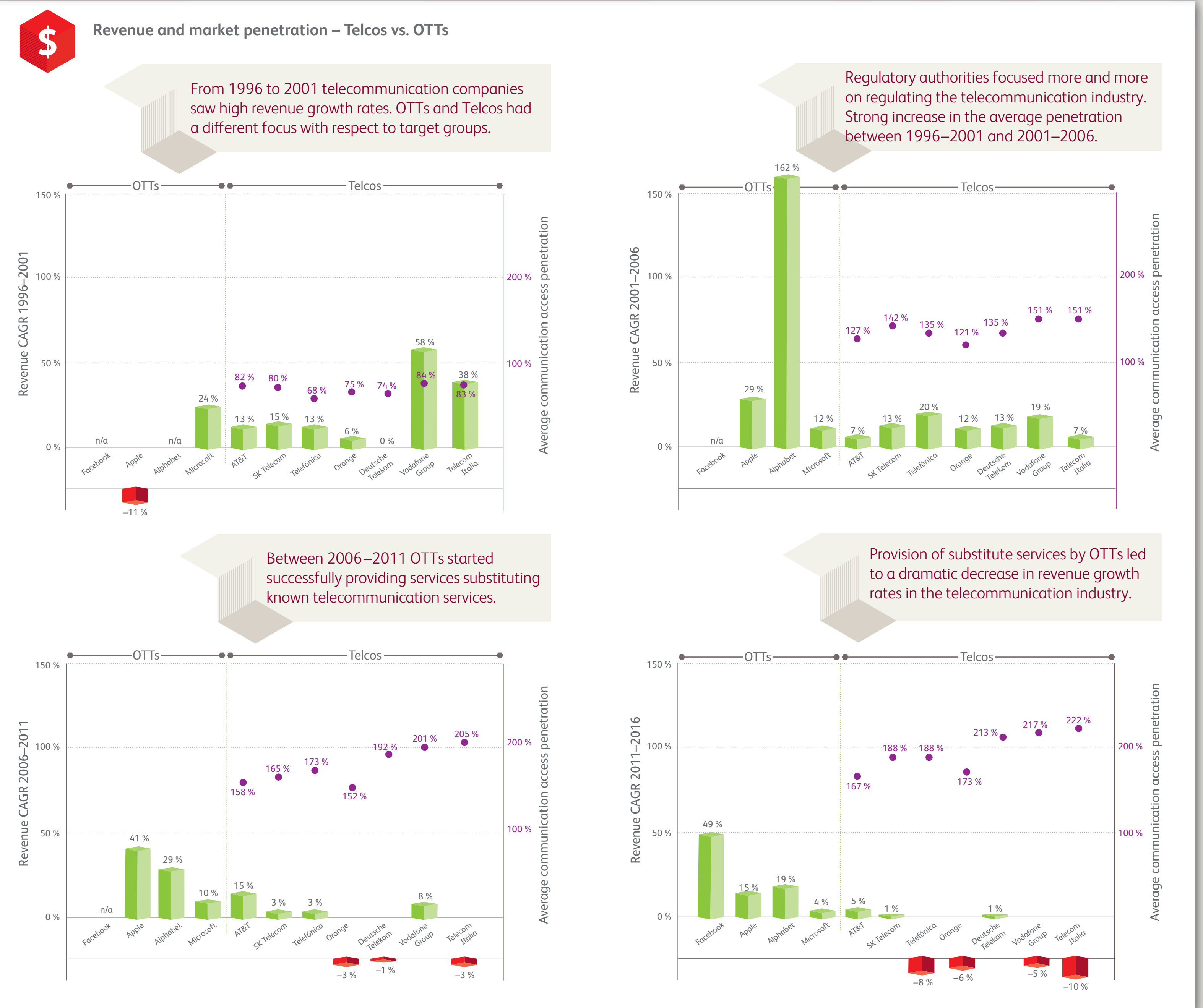
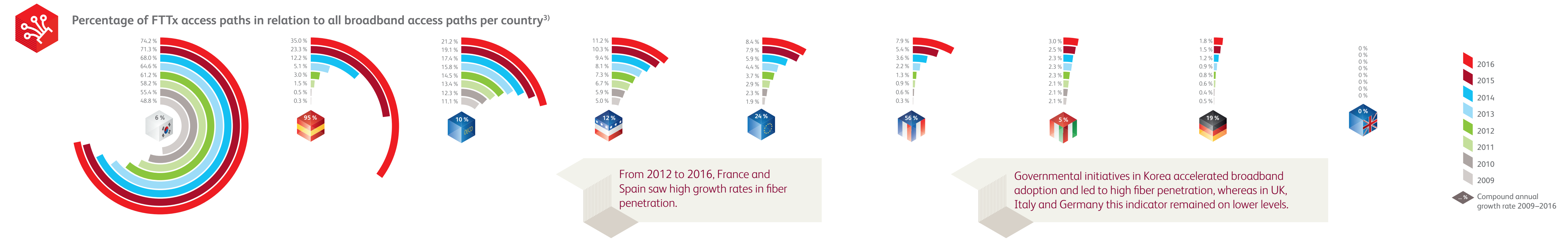
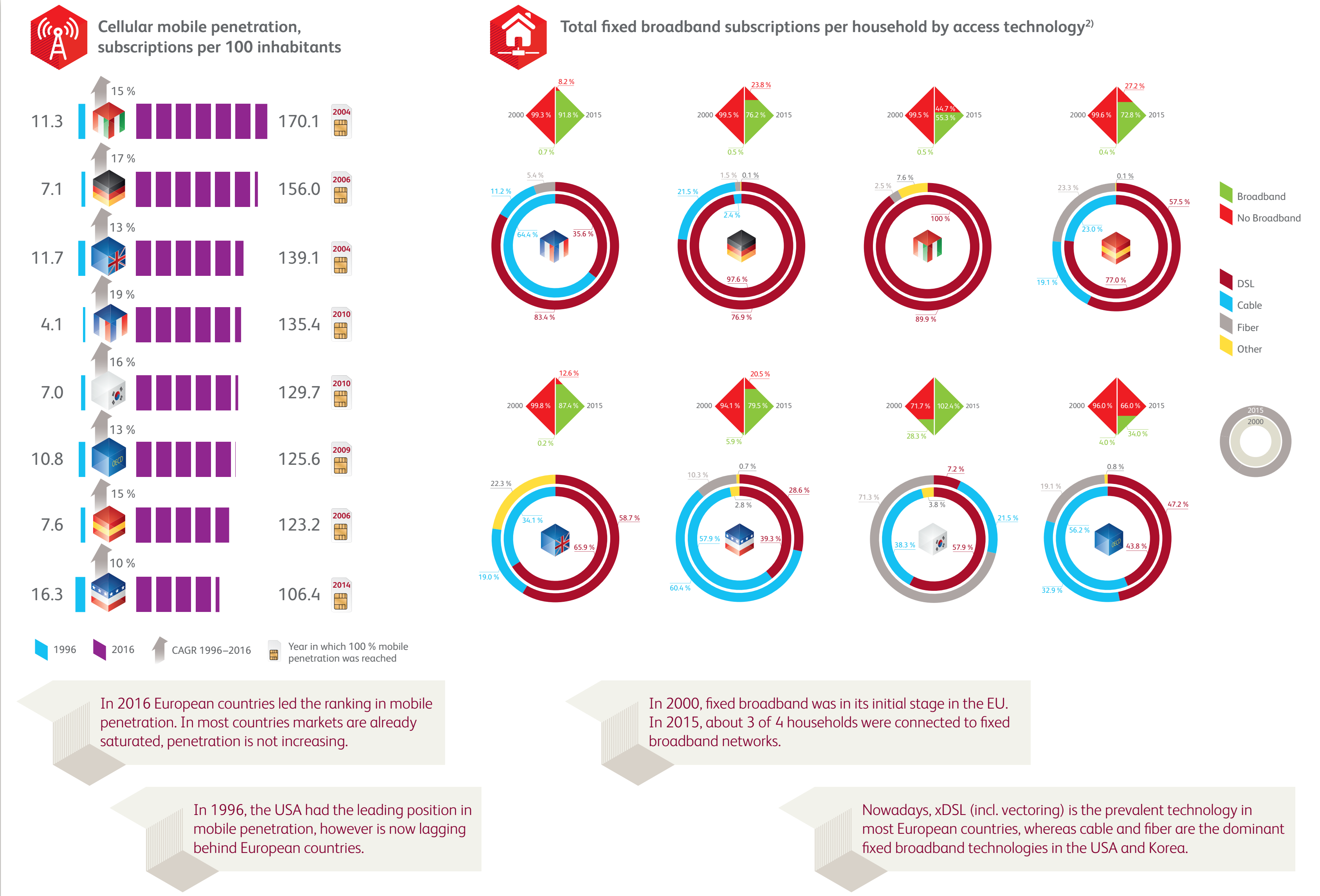


In the last 20 years, regulatory authorities have successfully supported the technological shift from fixed line based to mobile and broadband oriented communication

Telecommunication services are a necessary prerequisite for digitalization, M2M communication, Internet of Things (IoT), new forms of education, etc.

Key challenges for the regulatory authorities are, for example:

- Maintaining the balance between OTTs and "pure" network operators
- Acting as a catalyst to encourage new technologies – such as 5G, SDN, NFV
- Ensuring high quality telecommunication services are widely available
- Overseeing fair competition in the telecommunication market



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**Abbreviations**  
 3G 3rd Generation Mobile Network  
 3GPP 3rd Generation Partnership Project  
 5G 5th Generation Mobile Network  
 CAGR Compound Annual Growth Rate  
 DSL Digital Subscriber Line  
 EU European Union  
 FTTB Fiber-to-the-Building  
 FTTC Fiber-to-the-Cabinet/Curb  
 FTTH Fiber-to-the-Home  
 FTTP Fiber-to-the-Premises  
 GDP Gross Domestic Product  
 GHz Gigahertz  
 ICT Information and Communication Technology  
 IMT International Mobile Telecommunications  
 IoT Internet of Things  
 ITU International Telecommunication Union  
 Kbps Kilobit per Second  
 LTE Long Term Evolution  
 M2M Machine-to-Machine  
 MNO Mobile Network Operator  
 NFV Network Functionality Virtualization  
 OECD Organization for Economic Co-operation and Development  
 OTT Over-the-Top  
 SDN Software Defined Networks

**Sources**  
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 • Verband der Anbieter von Telekommunikations- und Mehrwertdiensten e.V. (VATM)/Association of Telecommunications and Value-Added Service Providers (VATM)

**Notes**  
 Numbers for 2016 partially estimated by BearingPoint Research.  
 1) Year of reference 2010 = 100%  
 2) According to OECD definition, subscriptions with advertised download speeds of at least 256 Kbps, incl. DSL, cable, fiber, other. The broadband data from 1997 to 2009 are calculated according to the 'old' OECD methodology including DSL, cable, fiber, other satellite and fixed wireless connections. Data as of 2010, the current or 'new' methodology separates all fixed and wireless connections.  
 3) According to OECD definition, fiber subscriptions include FTTH, FTTP and FTTB and exclude FTTC. For UK OECD offers no official data on fiber penetration. We estimate that number of FTTx access paths ranges between 780,000 and 980,000. For Germany fiber includes fiber lines provided by cable operators.