

# **Session theme: 5G: Evolution or Revolution?**

## **Presentation theme: Comparative Regulatory Scenarios for 5G**

**Presentation for:**

**Symposium on Spectrum 5.0: Policy choices for 5G Deployment**

**Convened by**

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\* This presentation is based on joint work with Prof Johannes Bauer, Michigan State University. A full paper entitled Roles and Effects of Access Regulation in 5G Markets (2018) is available <http://ssrn.com/abstract=3246177>  
Research assistance by Pratompong and Chalita Srinuan is gratefully acknowledged.  
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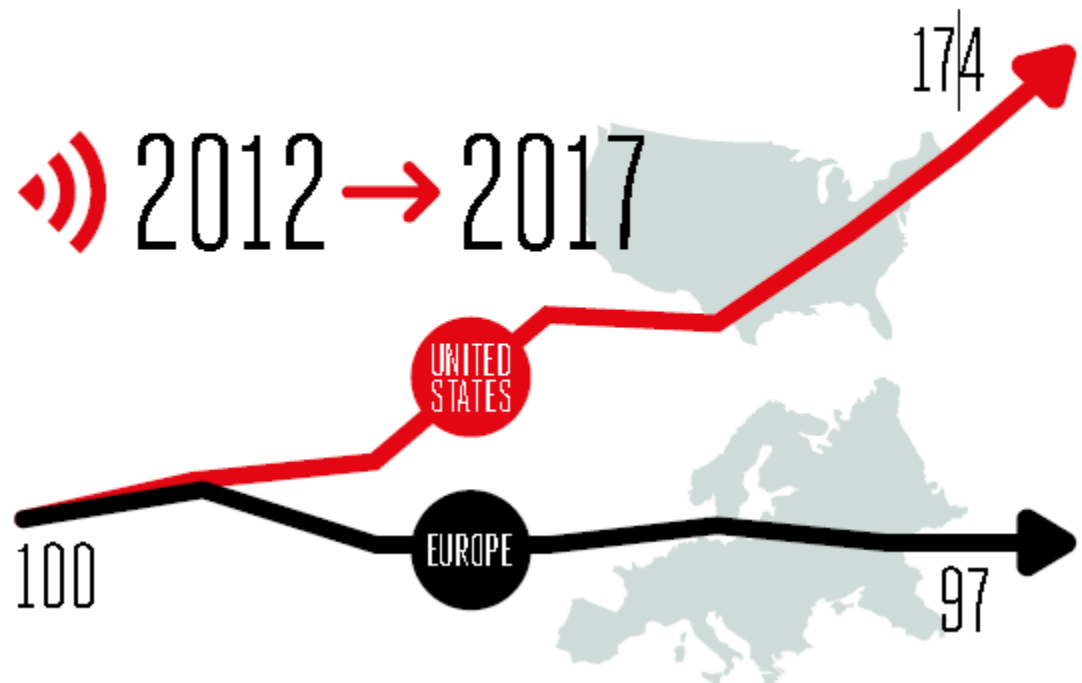


# Mobile Wireless Performance in the EU & the US

MAY 2013

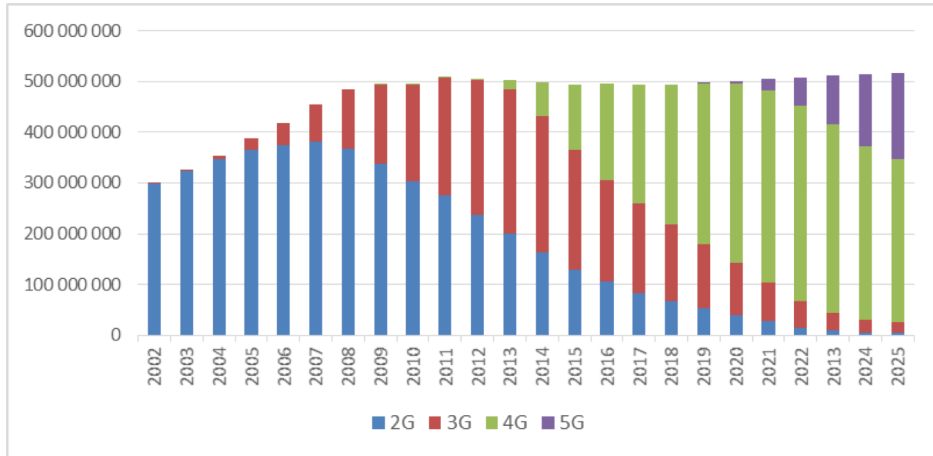
## Problem Setting: Regulatory Models for the EU for Wireless

**WIRELESS CAPEX IN EUROPE VERSUS THE U.S.**  
2007 = 100



Source: Mobile Wireless Performance in the EU & the US by Eisenhardt, Caves and Bohlin, 2013

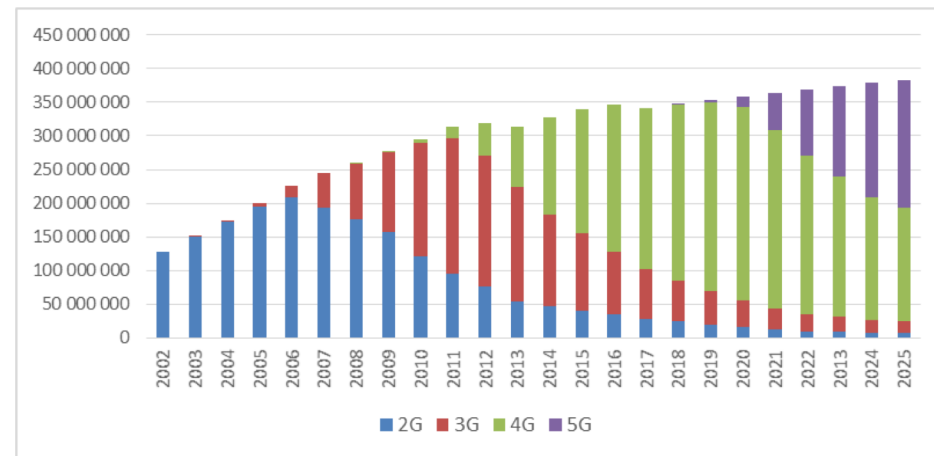
## Total mobile connections in the EU14 (2018-2025 estimated)



EU14 is here Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, and United Kingdom

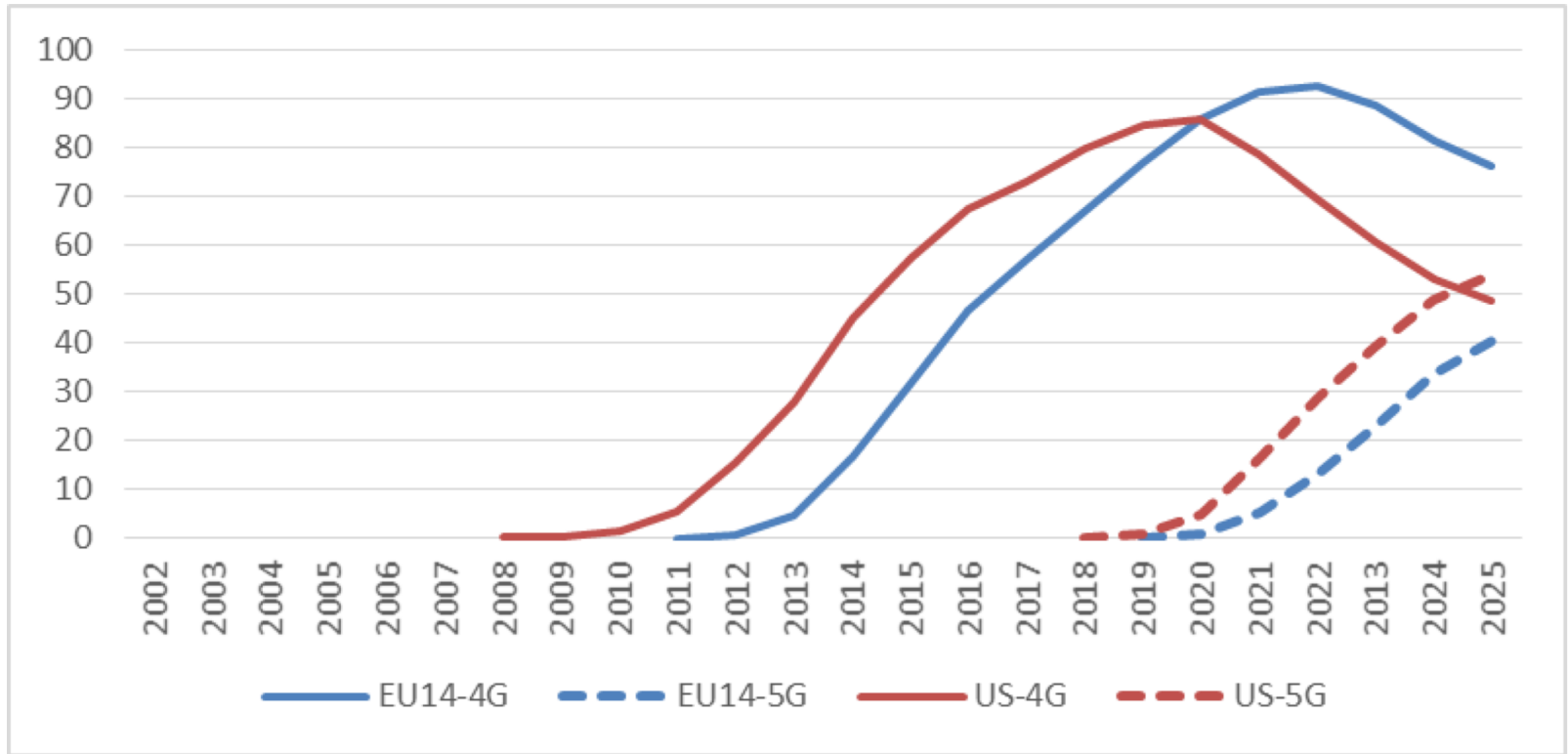
# Updating the GSMA 2013 Report

## Total mobile connections in the United States (2018-2025 estimated)



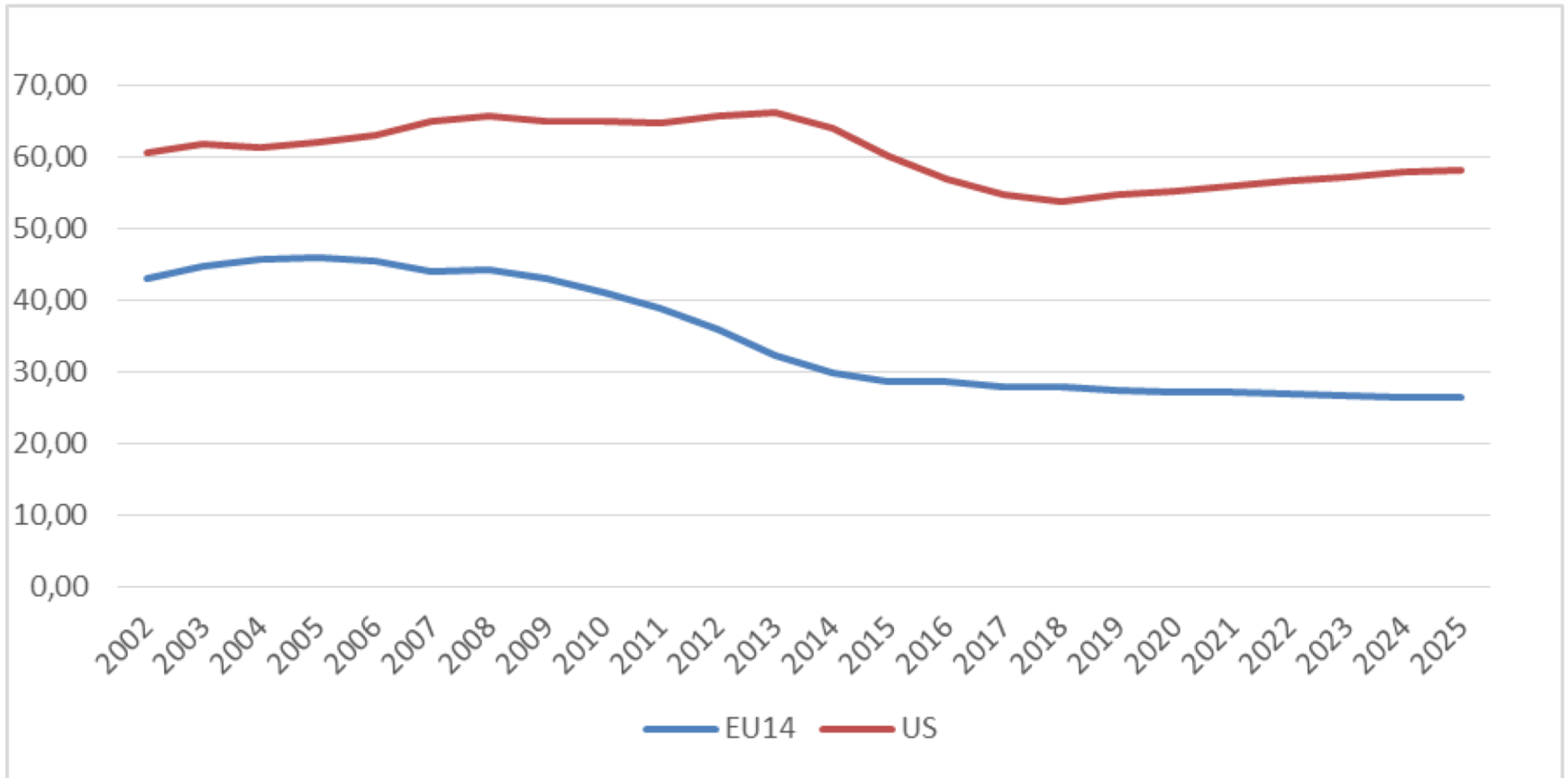
Sources: GSMA Intelligence; own calculations.

*4G and anticipated 5G adoption per 100 inhabitants (2018-2025 estimated)*



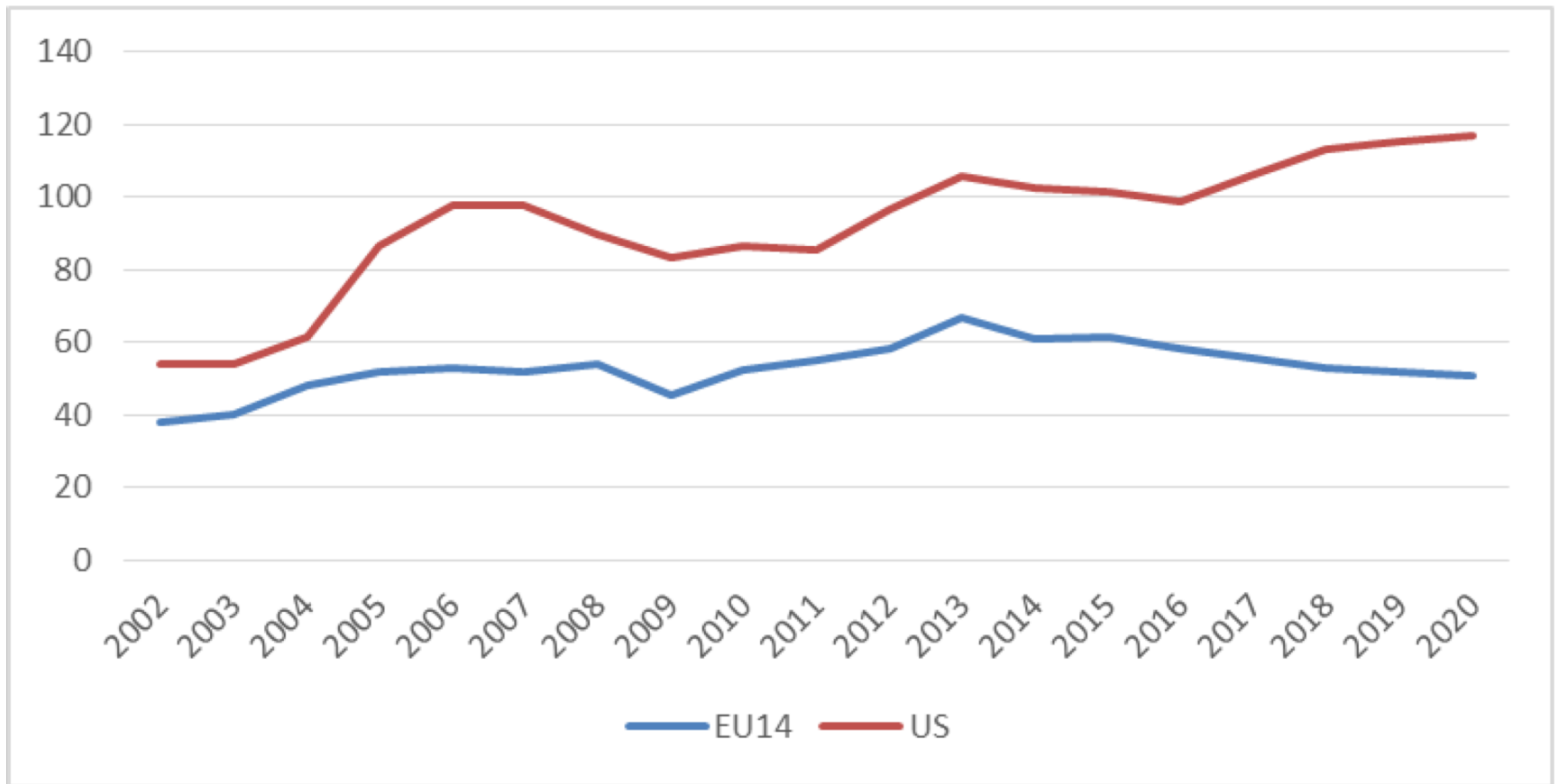
Source: GSMA Intelligence; World Bank World Development Indicators; own calculations.

## Monthly ARPU in US\$ (2018-2025 estimated)



Source: GSMA Intelligence, World Bank World Development Indicators; own calculations.

## Capex per inhabitant in US\$ (2018-2020 estimated)



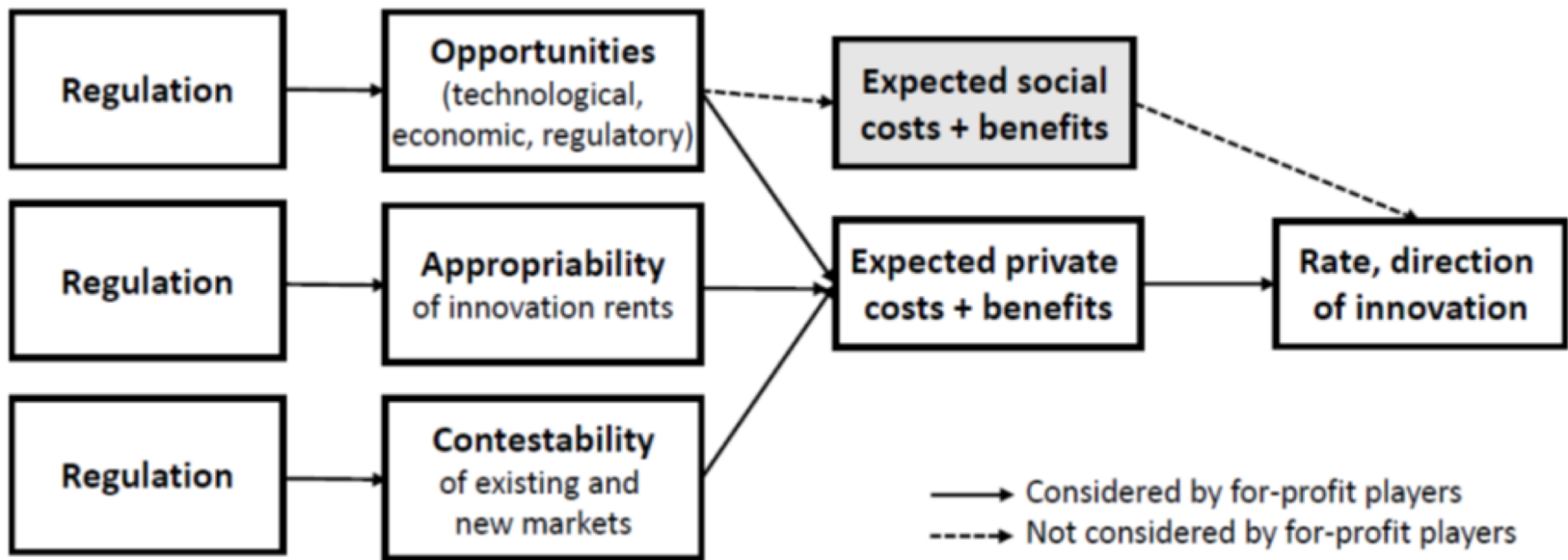
Source: GSMA Intelligence, World Bank World Development Indicators; own calculations.

Note: If the EU14 invested the same amount per capita as the United States, total capital expenditures in 2020 would be \$27 billion higher. Over the five-year period between 2020 and 2025, when capex will predominantly support 5G network deployment, the accumulated investment gap could be more than \$100 billion.

## *Policy mix of the three scenarios*

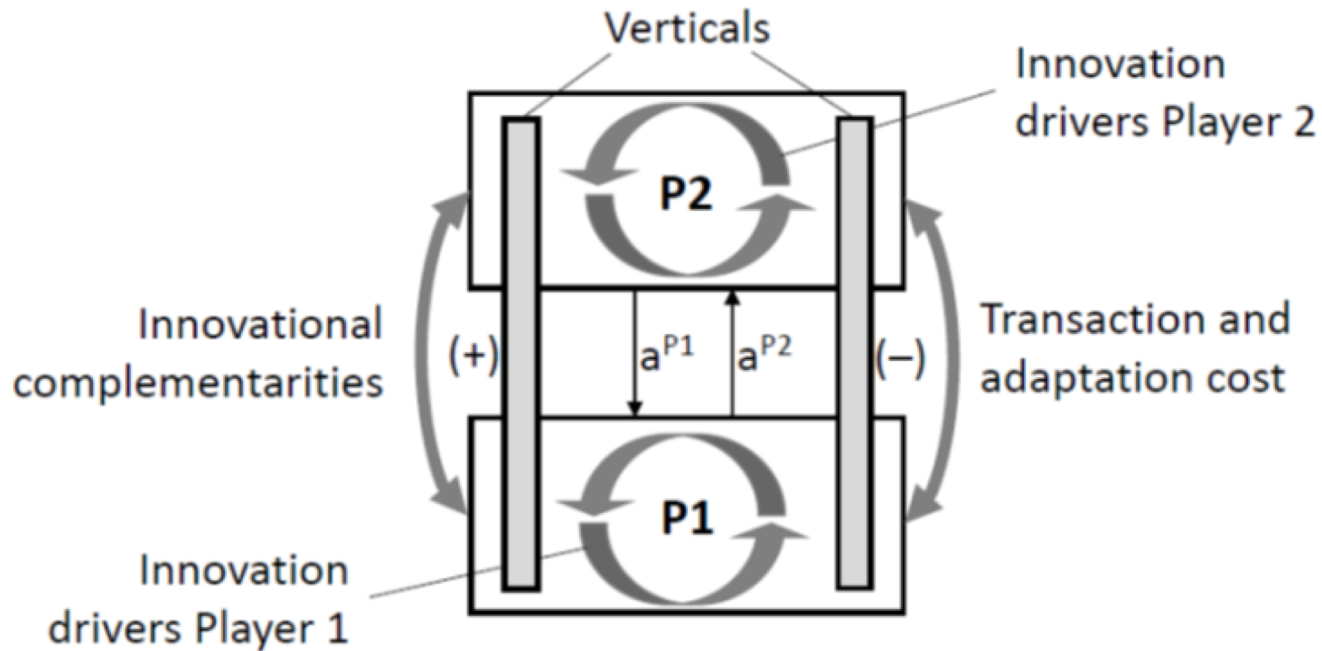
<b>Entrepreneurship</b>	<b>Regulated competition</b>	<b>Policy-push</b>
<ul style="list-style-type: none"><li>• Regulation provides a framework for competition</li><li>• Market power is primarily addressed using competition law</li><li>• Other public interest goals addressed with ex post regulation</li><li>• Network differentiation and service differentiation permitted</li><li>• Framework for network and spectrum sharing agreements</li><li>• Complementary program to achieve universal coverage</li></ul>	<ul style="list-style-type: none"><li>• Remedies after SMP test</li><li>• Network neutrality</li><li>• Complementary program to achieve universal coverage</li><li>• Licensed and unlicensed spectrum</li><li>• Framework for network and spectrum sharing agreements</li></ul>	<ul style="list-style-type: none"><li>• Regulated MVNO access</li><li>• Mandated openness/API access</li><li>• Network neutrality</li><li>• Regulated backhaul</li><li>• Rollout obligations in license</li><li>• Mandated civil engineering sharing</li><li>• Mandated networks/spectrum sharing</li><li>• Regionally differentiated spectrum assignments</li><li>• Proactive role of public sector</li></ul>

# Framework Driving the Scenario Analysis (I)





# Framework Driving the Scenario Analysis (II)



P1, P2 ... interrelated players (e.g., network operators, application developers);  
 $a^{P1}$ ,  $a^{P2}$  ... charges between players (may be positive, negative, or zero)