Occasional thoughts on the regulatory framework around mobile, television, telephony and the internet

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Hexagon

Study on Determinants of Investment in VHCNs reveals important findings to meet Gigabit Society targets

- **New European Electronic Communications Code places objective to promote investment in VHCNs.**
- **Major challenge to encourage private investment in fibre networks across EU.**
- **Study reveals how governments and regulators need to act taking account of complex ecosystem.**

The European Electronic Communications Code (EECC) requires national regulatory authorities to promote investment in very high capacity networks (VHCNs), defined as fibre networks at least to the distribution point[i].

In December 2018 the Body of European Regulators of Electronic Communications (BEREC) awarded SPC Network, in partnership with DAS Ltd, Strategy Dynamics and Greenwood, a contract to examine the determinants of investment in VHCNs using a System Dynamics modelling approach. The study, which can be downloaded from the SPC Network and BEREC websites, made a number of key findings:

i) Determinants of investment are path dependent. There is no single strategy suitable for all conditions.
ii) Ecosystems are Dynamic.
iii) Actions taken by NRAs affect not just the regulated firm but have foreseeable second order effects throughout that ecosystem, which need to be captured to prevent unintended consequences.

The European Union has set the objective of developing a gigabit society by 2025, in which European citizens have access to ultrafast broadband. This gigabit society is seen as necessary it keep Europe competitive in a digital world. The Commission seeks to encourage investment in VHCNs and the EECC, due to be transposed into national laws by December 2020, has as one its aims to "implement an internal market in electronic communications networks and services that results in the deployment and take-up of very high capacity networks" (Article 1(2)(a)).

The challenge for member states and NRAs is how to achieve that objective, given that the vast majority of the investment in VHCNs will have to come from the private sector.

A starting point for understanding how to overcome the challenge is to realise that the electronic communications market is a complex ecosystem, comprising many actors with diverse objectives. Amongst network builders there are various strategies: ranging from the incumbent operator responding to competition from alternative networks reducing their market share, to the new entrant who

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summarised their strategy as "*we build where they don't*".

These actors do not act in isolation: the strategic choices of one player has direct and indirect (first and second order) effects on other players. Even actions taken by regulators, which only directly affect the regulated undertaking, have second order effects on other players in the ecosystem.

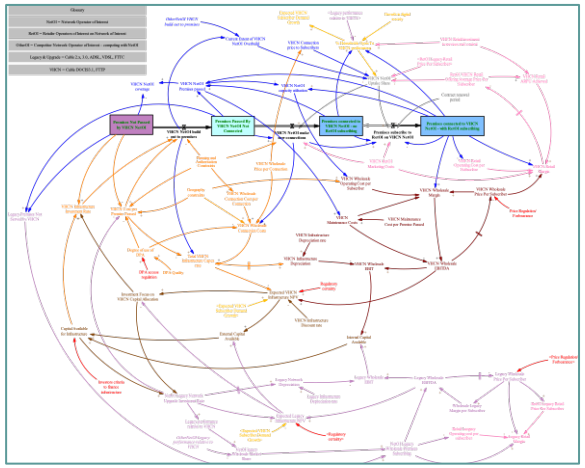
To understand these complex interactions and how they affect determinants of investment, BEREC specifically wanted to use a modelling methodology known as System Dynamics (SD).

SD modelling starts by creating a qualitative model (shown below), plotting the relationships between actors and their actions. We can then see how the actions of one player affect all other players in the market.

The SD model in this project was built around the Net Present Value (NPV) equation, used by investors to decide where, when and how much to invest. The NPV equation considers the cost of network build, future cash flows and the cost of capital.

The importance of using this model was highlighted by the representative of a finance company. When asked how they decide to make an investment, he answered succinctly:

"We look at the projected NPV. If it's large enough we're interested. If it isn't we're not. Simple"



An important feature of an SD model is that it can capture reinforcing "causal loops", that can accelerate investment, and "balancing loops", that may set a cap or limit on the potential for investment.

In this study, the SD model was designed to capture all of the investment drivers found across all of the Member States of the EU, but from that it is possible to tell stories of how investment has happened in individual countries.

For example, we were able to use the model to show how good duct access and specific regulatory and pricing decisions spurred investment in Spain, despite initially low consumer demand. Likewise, we could show how competition from cable was an important determinant of fibre investment in Ireland and how a high consumer willingness to pay created a demand-side pull in Sweden.

The model can also be used to examine "what if…" questions. As an example, the model can be used to assess how investment in VHCNs may change if "patient capital" investors, who have a longer time horizon for payback, and/or lower threshold rate of return, entered the market. Similarly, the model could be used to ask how improving access to non-telecoms physical infrastructure might change investment.

The study was designed as a research tool for BEREC and its members, but a number of clear conclusions can be drawn from the work so far.

Determinants of investment are path dependent and must be considered in the light of national circumstances.

First, there is a difference between **drivers** of investment and **determinants** of investment. A universal set of drivers of investment exists, such as low cost of supply. However, determinants of investment are contextual and depend on the conditions within a country or region and will differ between operator business models.

A simple example is duct access, which lowers the cost of network build. We would consider this to be a driver of investment, but it can only be a determinant of investment where good quality ducts exist and regulation is well designed to support access.

Secondly, it follows from the above that there is **no universal strategy** that will work for all countries. Determinants of investment are path dependent, significantly affected by legacy national and regional conditions. The actions of investors and regulators in one country are not always easily transferrable to another with a different legacy. The examples of Spain, Ireland and Sweden noted above clearly illustrate how different strategies are applicable in different countries and that one size does not fit all.

Thirdly, conditions are not static. Demand for VHCN is evolving impacting revenue potential and the capital costs to connect any premises not yet served by VHCNs.

Regulatory decisions have second and third order effects, with potential unintended consequences.

Last, but by no means least, although regulators can only directly affect operators with SMP, there are second and even third order effects on other players in the market. SD models are particularly useful in illustrating how an action designed to affect one player may also affect others. They show how a complex set of interlocking markets lies between regulatory action and the downstream consequences for the public[ii]. Those downstream consequences may not always be intended by the regulator. If it only considers the impact on the regulated firm, it may miss other effects through the system.

In the light of this finding, regulatory and national policies should consider the impact across the range of operator business models. Foreseeable unintended consequences may be missed if these second and order effects are not considered.

To learn more about this study, contact SPC Network.

[i] DIRECTIVE (EU) 2018/1972 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 establishing the European Electronic Communications Code, Article 2(a).

[ii] Graham, A. K., & Godfrey, J. (2005). Achieving win–win in a regulatory dispute: Managing 3G competition. In *Proceedings of the 2005 International System Dynamics Conference*.