

Cost Benefit Analysis for Broadband Intervention & Discussion

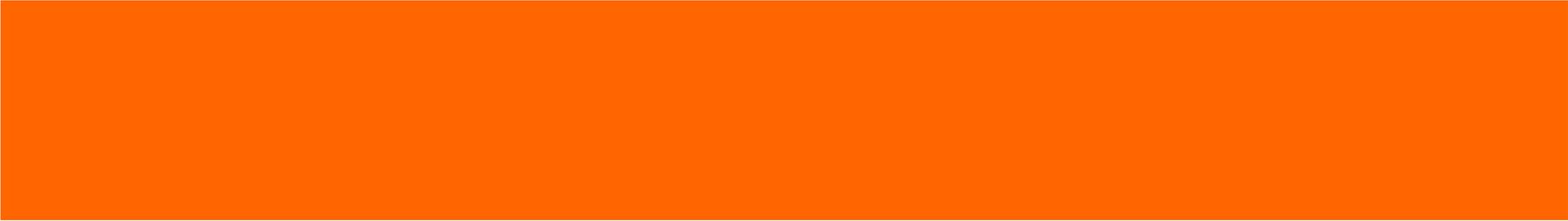
Dr Steve Sheppard

A presentation by

adroit
economics ltd

Scope of Presentation

- Need for cost benefit analysis
- Who benefits from and types of benefits
- General points about the importance of broadband
- Benefits - sources of evidence
- How to model the benefits of satellite deployment
- Communicating the results



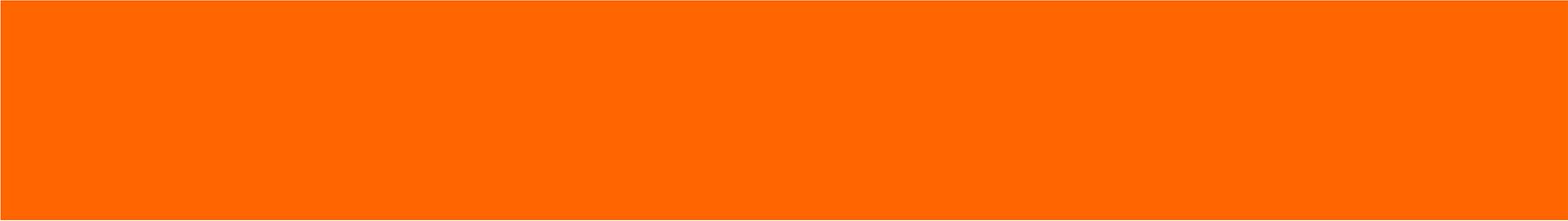
Need for cost-benefit analysis

Need for Cost-Benefit Analysis (CBA)

- To show the **Return-on-Investment** (RoI) of investment of public funds
 - = Demonstrating *value for money*...5:1, 10:1, 30:1
 - = Allowing policy makers/funders to *compare* broadband interventions against investment in other policy areas
 - = Enabling comparison between different *options* for broadband intervention

What does a cost-benefit analysis look like?

- Typically a **cash-flow spreadsheet**
 - = Time across the top – 10, 15, 20 years
 - = Monetised **beneficiary** costs + benefits down the side
 - = Totalled at the bottom for each year
 - = Annual balances are added up using the **Net Present Value function** (NPV) @ 3.5% (typically)
 - = This gives the **net additional benefits** of the project
 - = This is divided by the 'investment' to calculate **RoI/VfM**



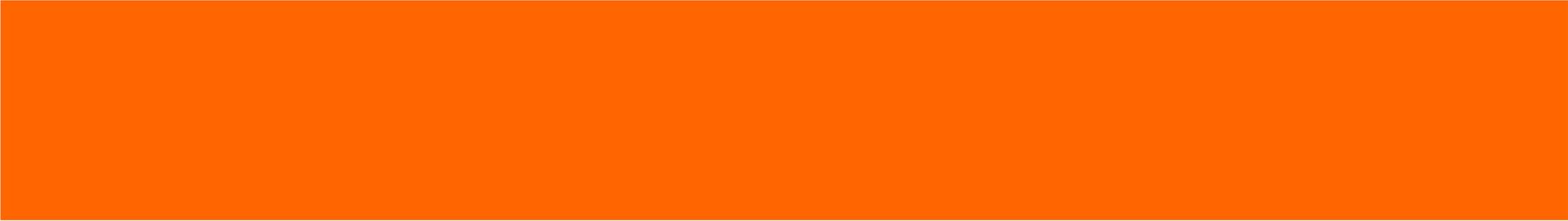
Who benefits and types of benefit

Types of benefits and beneficiaries

- **Economic**
 - = Firms – small, medium (and large)
 - = Use of ICTs boosts productivity, innovation and enterprise
 - = Digital connectivity is an increasingly essential component of ICTs
- **Social/ Community**
 - = Education
 - = Access to jobs
 - = Access to health and other services
- **Public Sector**
 - = Service delivery cost savings – via online transactions
 - = Schools
 - = Health

Typical benefit metrics

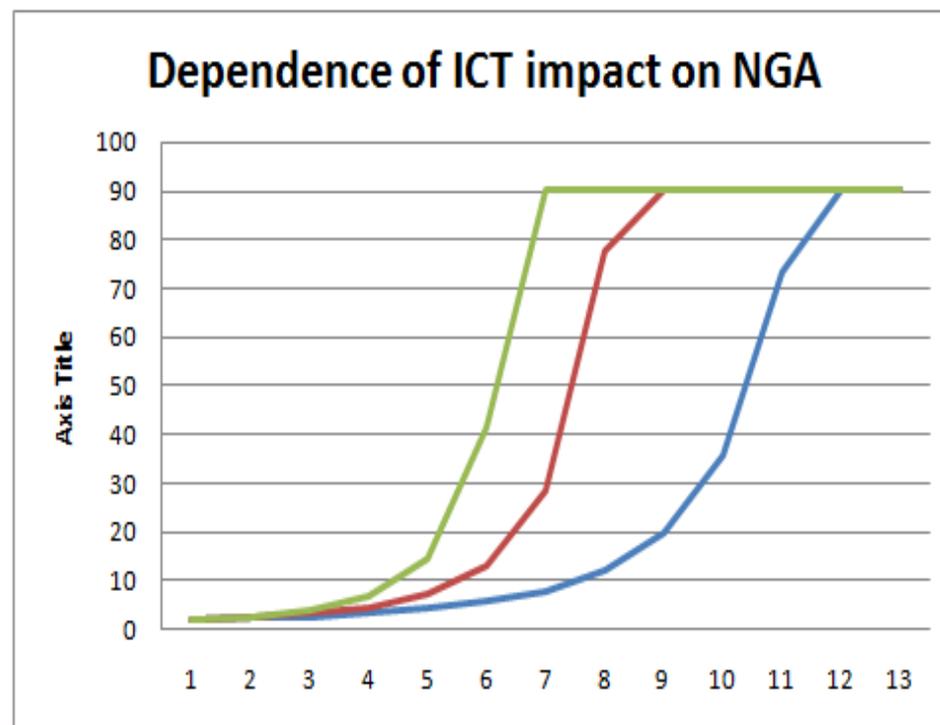
- **Economic – SMEs**
 - = Net additional GVA
 - = Equivalent jobs
- **Social – households**
 - = Cost savings
 - = Increased lifetime earnings
- **Public services**
 - = Cost savings
 - = Increased quality 'relative value' of services



Some general points about the importance of broadband

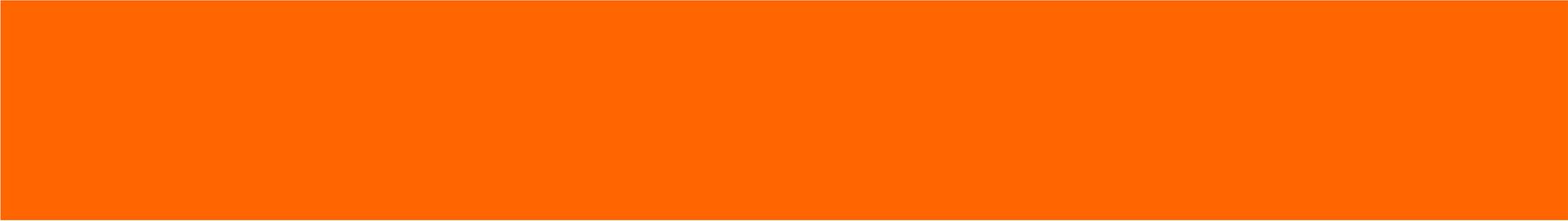
How much impact does broadband have?

- The importance of broadband, to firms, to households, to public services is almost entirely **relative**
 - = Relative to what everyone else has



The impact of **NOT HAVING** broadband

- **.....it is not far off becoming terminal**
 - = SMEs cant compete and close or relocate
 - = Start ups cant start or start somewhere else
 - = Home working cant happen
 - = Inward investors wont come
 - = Households increasingly disadvantaged
 - = Houses wont sell
 - = Tourists wont rent holiday homes, stay in hotels
 - = NOT HAVING BROADBAND increasingly contributes to decline of whole community
 - = Public services inefficient....and...have to deliver more to declining community



Benefits – sources of evidence

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- **Benefits to SMEs**

- = Evidence of the benefits of ICTs – of which broadband is a component
- = Direct evidence of the benefits of broadband
 - Macro-economic studies
 - Surveys
 - Programme evaluations
 - Case studies
- = Evidence of benefits of 1st generation broadband, of 2nd generation broadband
- = Evidence is just emerging of super fast and ultra fast broadband

- **Benefits to households**

- = Evidence from digital exclusion studies
- = Thematic evidence – retail sector (re shopping online); home working studies etc

- **Benefits to public sector**

- = eGovt studies/ strategies – evidence of unit cost savings in particular

- **Wider benefits to the area**

- = Little available

McKinsey & GMI Study (2011)

- Internet accounts for **3.4% of GDP** growth in 13 countries
 - and **21% of GDP growth** in the last five years of the more mature countries.
- 2.6 jobs are created for every one that is lost in SMEs
-with **10% productivity** growth for SMEs.
- The Internet's impact accounts for 21% of developed countries' GDP growth over the last 5 years
- Most of the economic value created by the Internet falls outside of the technology sector
 - 75% of the benefits captured by companies in more traditional industries.

Internet Matters: the Net's sweeping impact on growth, jobs and prosperity

Impact of Broadband Ericsson, ADL and Chalmers (2011)

- Study of 33 OECD countries by Ericsson, Arthur D. Little and Chalmers University of Technology
 - Doubling the broadband speed increases GDP by 0.3%
 - Quadrupling of speed equals 0.6% GDP growth stimulus.
 - 10 percentage point increase in broadband penetration GDP increases by 1 percent
 - **Total = 1.6 percentage point GDP increase**

Latest evidence from UK

- Govt Agency study of rural gap filling programme
 - = Super fast broadband will add £17 billion (0.07 percentage points) to UK's GVA by 2024.
 - = Rural gap funding superfast programme will add **£6.3 billion p.a.** by 2024, equivalent to an uplift of 0.03 percentage points on the UK's real annual GVA growth

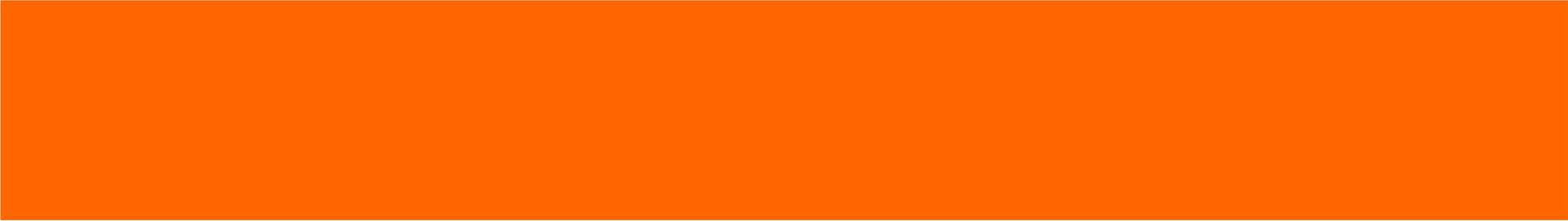
Latest from UK

22-city ultrafast broadband impacts

- Adroit Economics has just completed a series of case studies showing benefits to firms of ultra fast broadband
 - = This was for Govt agency, to go on an information website
 - = Case studies were in-depth, got to the bottom of how firms use broadband, and put numbers on the cost savings and productivity gains
 - = The case studies include videos of firms explaining the benefits – powerful

Results from 22-UK city SME ultrafast broadband impact case studies

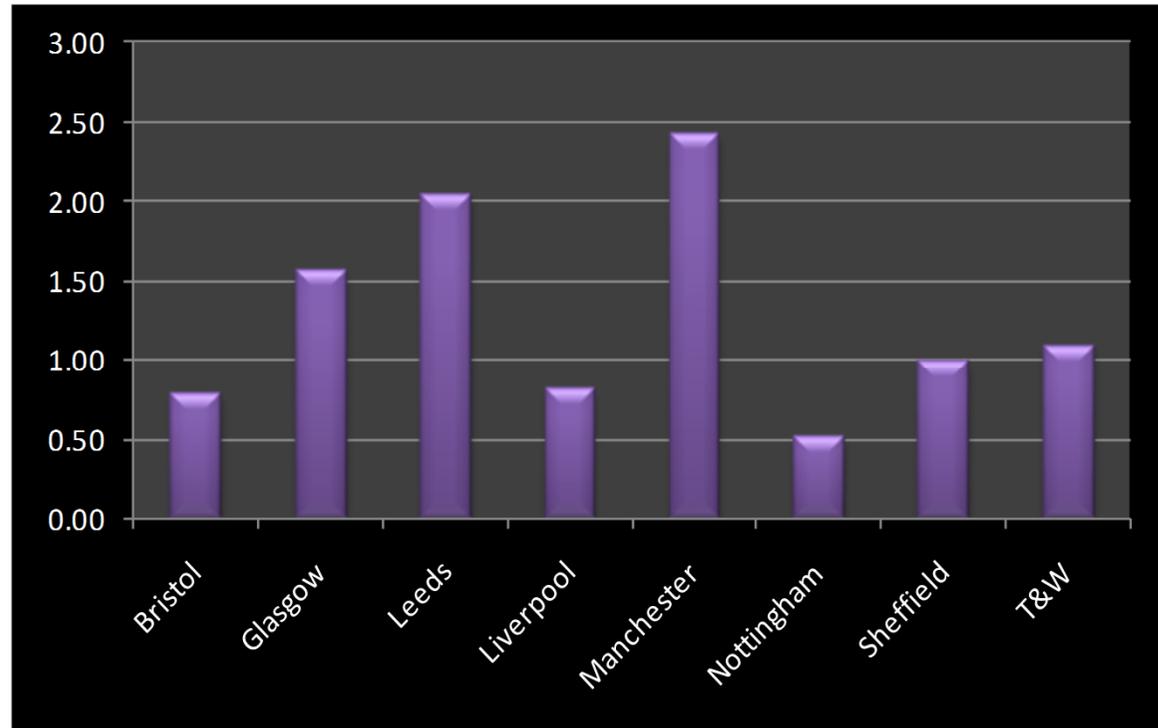
- Results were surprising
 - = **Benefits substantial** – very significant implications for economy
 - Time saving, cost saving, increased productivity, increased customer service, increased market share, expanding into multiple offices and countries so much easier
 - = **Common types of technology/** application and services
 - VOIP; Video Conferencing, Large file sharing/ joint working, Back-up and disaster recovery, Cloud, home-working, mobile working
 - = **Overall message of bandwidth congestion**
 - Might be OK if one person is doing lots of things on the internet, not if all 5 or 10 people in the office are – slow, crashes, drop outs



Examples of broadband benefit models

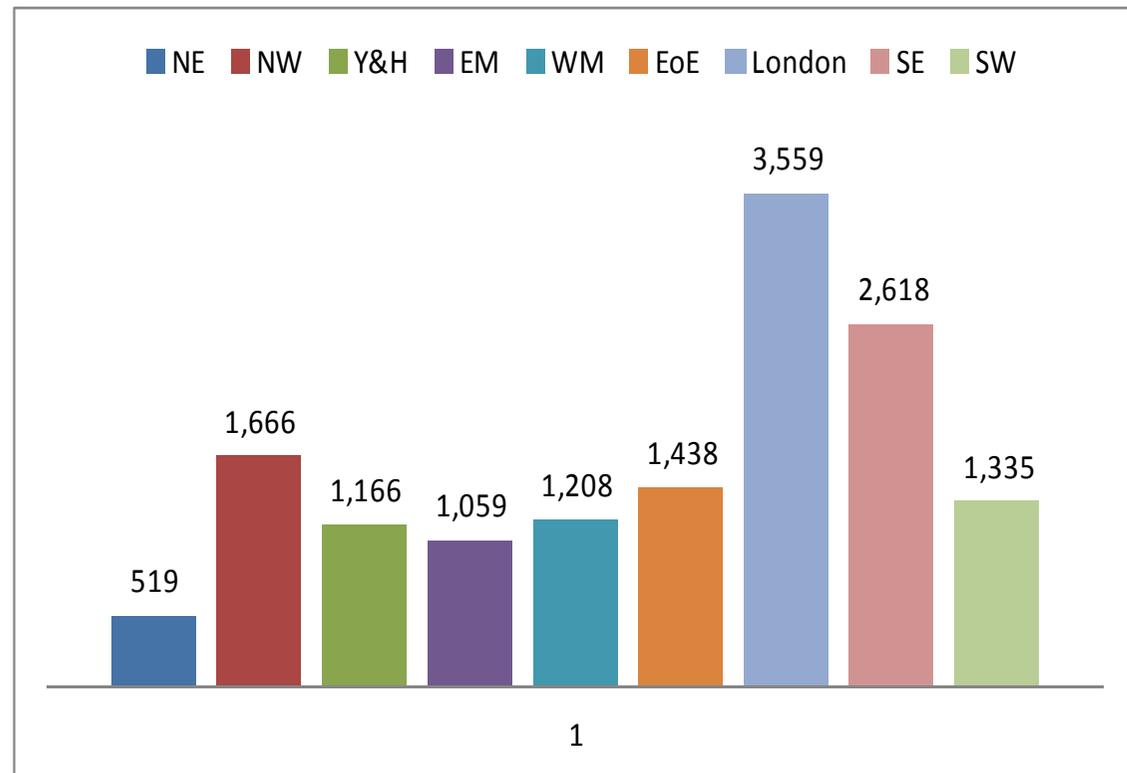
Examples of our broadband benefit models

- Adroit **SME ICT impact model**, created for UK's IT skills council
- Estimates GVA impact of all ITCs, of which broadband is a component
- **£bn 5-7yrs**



Examples of our broadband benefit models

- Adroit **SME ICT impact model**...contd.
- Of which, due to faster broadband
- **£m**

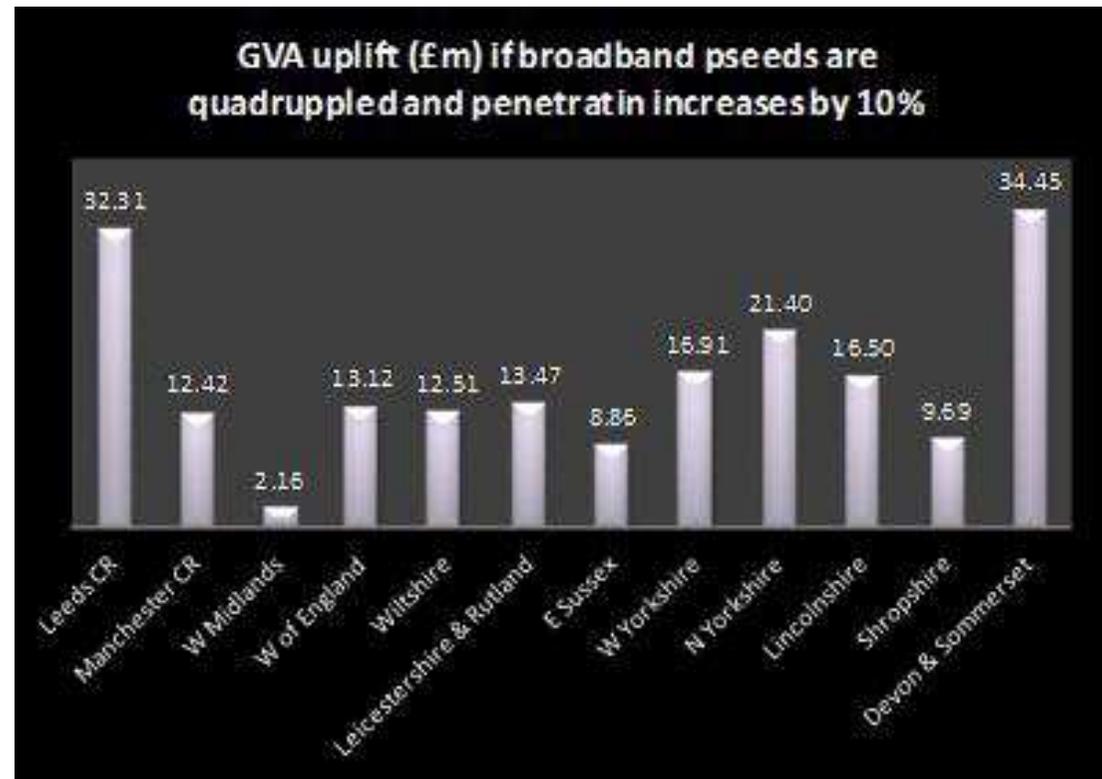


Examples of Adroit's broadband benefit models

- **Benefits of ultrafast broadband to SMEs in 22 UK cities**
 - = **10-15% time saving** – staff can then use this time more productively. As an economist, I can tell you this represents a big productivity increase
 - = **5-10% cost savings** – phone, travel to meetings, back-up, disaster recovery, software – [costs depending on company - still to be modelled]
 - = **5-10-50-200% plus increased sales** - better customer service, tie-in....selling more to existing customers, to new customers...expanding into new offices, new countries, a lot easier
 - = **Transformational** – 30-40% productivity increases, through to being able to stay in the game
- **Wider**
 - = Home working, mobile working – more productive
 - = Reliability, reduced risk re manual back up

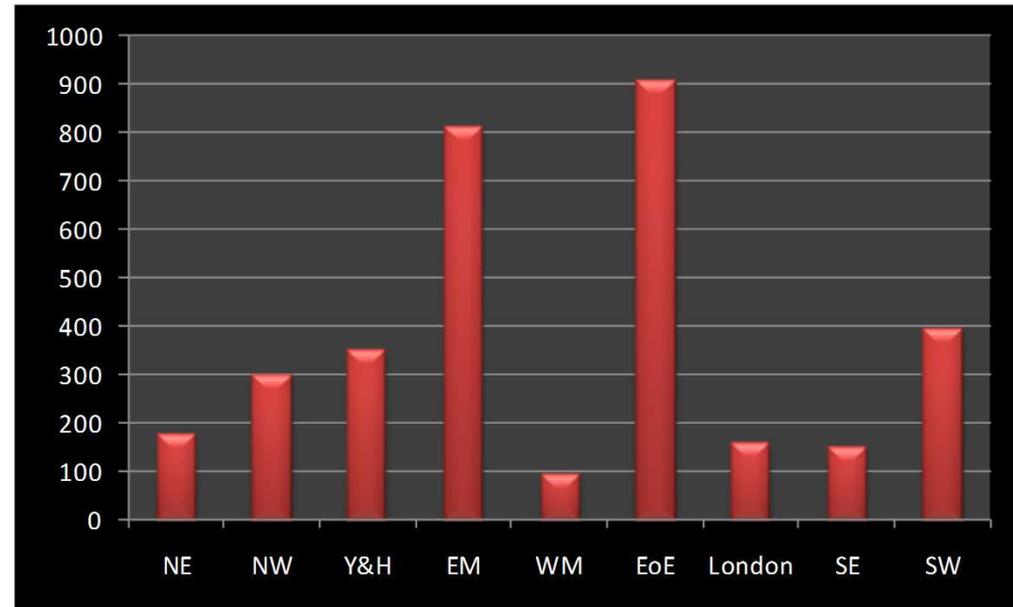
Examples of Adroit's broadband benefit models

- Adroit **rural bb gap filling impact model**
- Estimates GVA impact if **100% of white area covered** and taken up
- **£bn 5-7yrs**



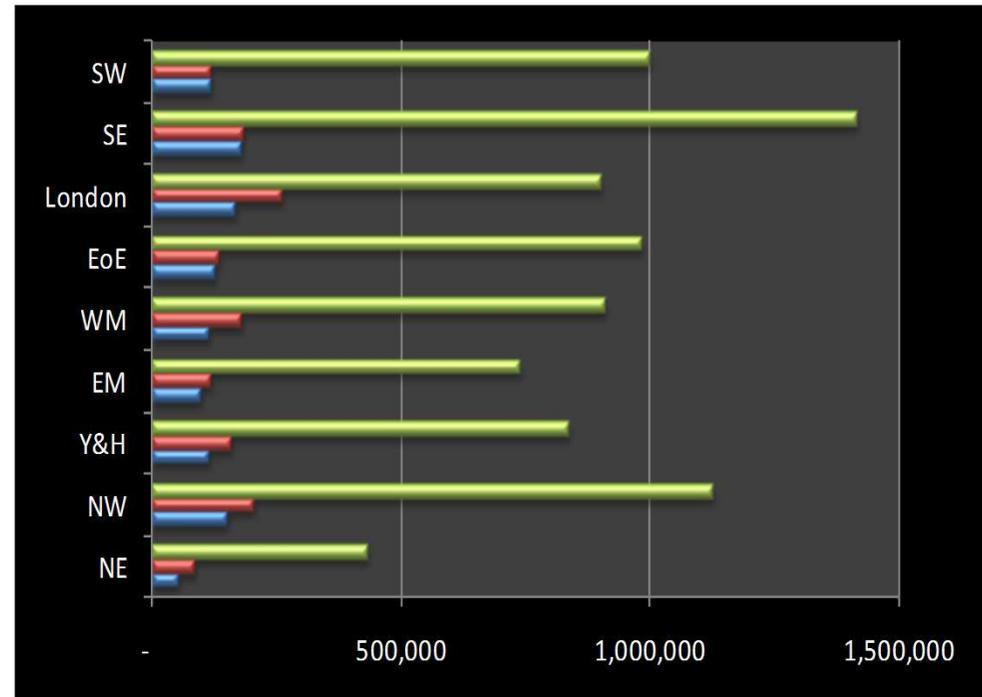
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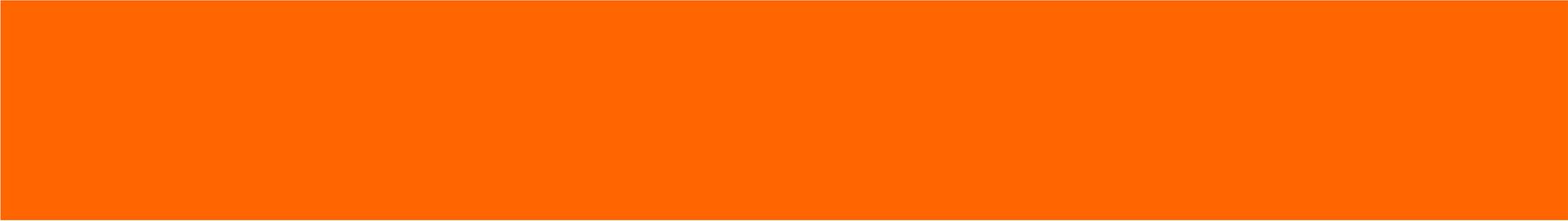
- Adroit **digital exclusion model** created UK's IT skills council
- Estimates lost benefits for households if not on the internet
- **Additional lifetime earnings £m from improved education results GCSE**



Examples of Adroit's broadband benefit models

- Adroit model used for Scottish Highlands
- Estimates **public service efficiencies** derived from household internet use
- **Reduce visits to the doctor – translates into cost savings**





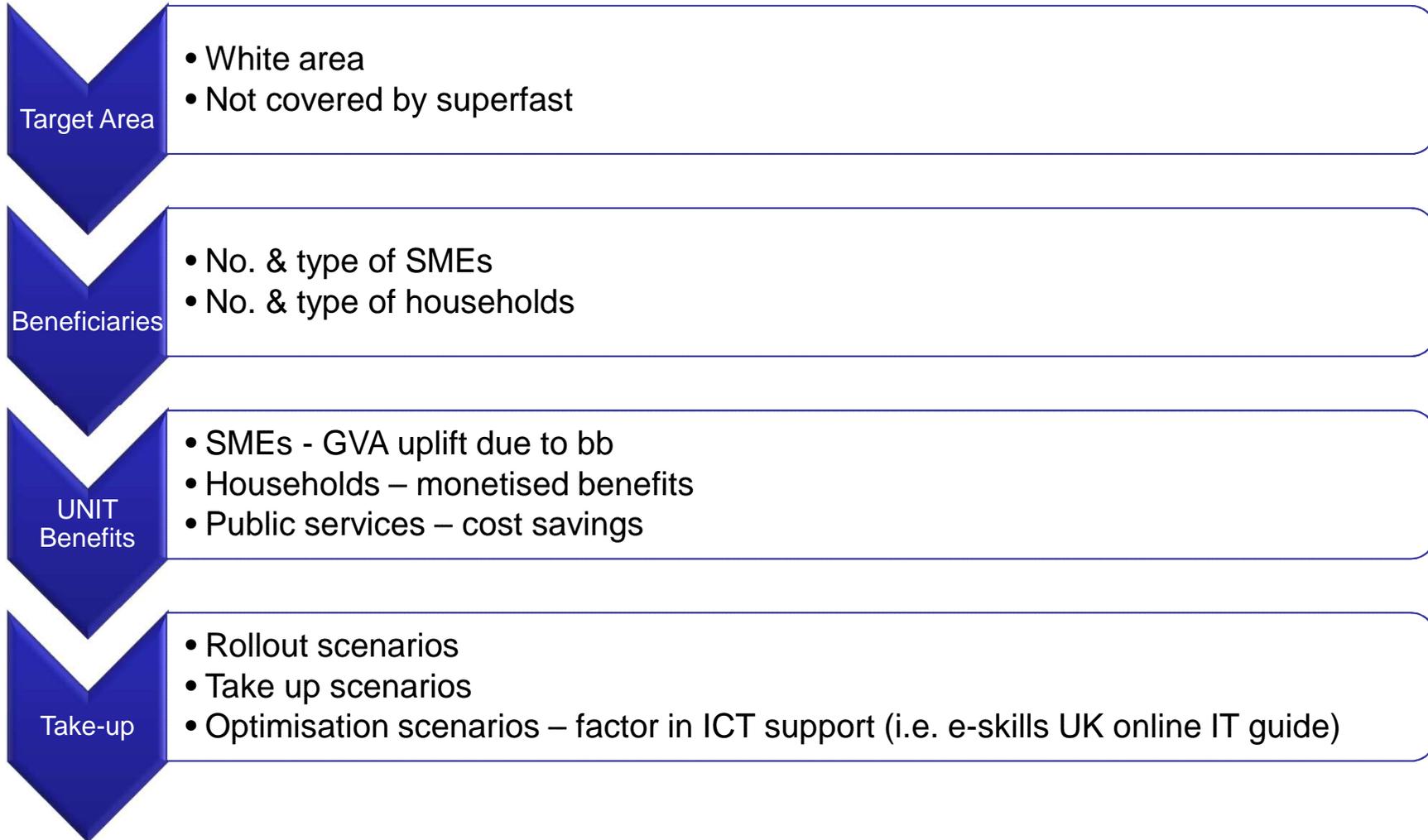
How to model the benefits of satellite deployment

How to model the benefits of satellite deployment

- Use an excel spreadsheet
- Use simple formula – no complicated black box stuff
- Formulate a ‘calculation logic chain’
- Sensitivity testing, scenario (range) modelling
- Risk assessment (if required) Monte Carlo etc.
- Audit trail critical – show source of every input and basis of every assumption

Impact logic chain

No of beneficiaries affected by gap * lost benefit = policy target

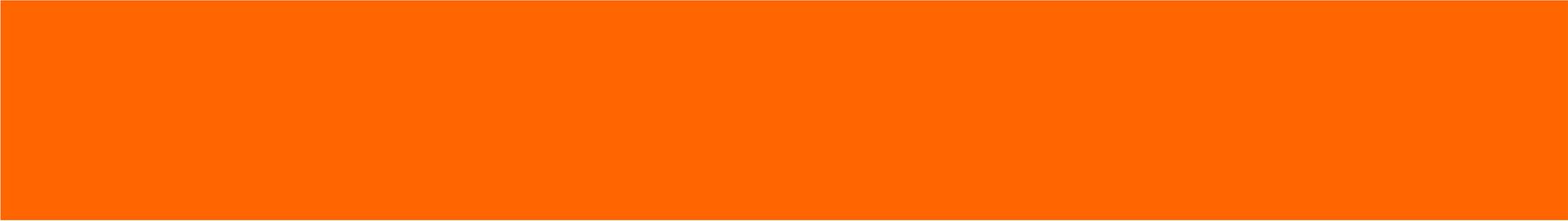


Some key Issues – satellite broadband impact modelling

- **Where to get data on No. & type of beneficiaries?**
 - = Start with high level estimates – applying top-down metrics
 - = Follow with local mapping/ surveys
- **What impact evidence is best?**
 - = Start by using growing body of existing evidence
 - **Top-down** – national studies, programme evaluations
 - **Bottom-up** – existing case studies of beneficiaries that already have bb + adverse impacts of not having it (exclusion)
 - = Study area specific
 - **Top-down** – survey
 - **Bottom-up** – case studies
 - = Sector specific evidence – farming
 - = Wider impacts – contributing to spiral of decline
- **Take up and optimisation scenarios**
 - = Importance of building in ICT business support to ensure max optimisation
 - i.e. e-skills UK's online IT guide (currently used in Highlands of Scotland for example)

Additional benefits modelling is also possible

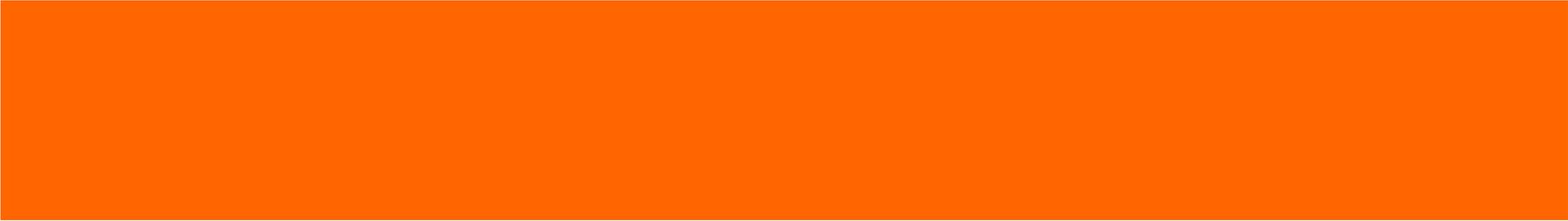
- **Focus on most affected industry sectors**
 - = Agriculture and farms – created more in-depth detailed case-study based impact model
 - = Tourism-visitor economy
- **Model secondary and wider impacts, of not having broadband, on the area**
 - = Business closures/ migration
 - = Population migration
 - = Falling tourism-visitor economy
 - = Spiral of isolation and decline
 - = Increased cost to public services



Communicating the results

Communicating convincing results

- Don't exaggerate the evidence
- In-depth case studies the most compelling
- Video showing firms/households explaining in their own words the importance of broadband is very compelling
- Build into the model metrics from case studies
- Avoid overly complex 'black-box' models
- Show all workings and assumptions – fully audit trailed
- Undertake sensitivity, scenario and risk analysis
- Present in the form of a full formal options appraisal report



Discussion

Making the business case for

Satellite

Way Forward

Discussion – way forward: 3 possible options

- **Share methodology, models, standard unit metrics**
 - = But everyone undertakes their own benefits modelling
- **Develop a pool of compelling case studies and surveys providing database of benefits**
 - = But everyone undertakes their own benefits modelling
- **Develop a shared model and results across several countries or all member states**
 - = Everyone uses this as common platform to estimate benefits and RoI