

Part III.8 Supplementary Information Sheet for the notification of an evaluation plan

Member States must use this sheet for the notification of an evaluation plan pursuant to Article 1(2)(a) of Regulation (EU) No¹ 651/2014 and in the case of a notified aid scheme subject to an evaluation as provided in the relevant Commission guidelines.

Please refer to the Commission Staff Working Document 'Common methodology for State aid evaluation' for guidance on the drafting of an evaluation plan.²

1. Identification of the aid scheme to be evaluated

(1) Title of aid scheme:

SA.63170 (2021/PN) RRF — 'Piano Italia a 1 Giga'

(2) The evaluation plan concerns:

- a) A scheme subject to evaluation pursuant to Article 1(2)(a) of Regulation (EU) No 651/2014?
- b) A scheme notified to the Commission pursuant to Article 108(3) TFEU?

(3) Reference of the scheme (to be completed by the Commission):

(4) Please list any existing ex-ante evaluations or impact assessments for the aid scheme and ex-post evaluations or studies conducted in the past on predecessors of the aid scheme or on similar schemes. For each of these studies, please provide the following information: (a) a brief description of the objectives, the methodology used, the results and the conclusions; (b) the methodological specific difficulties that evaluations and studies have encountered, for example the availability of relevant data for the evaluation of the current evaluation plan. If appropriate, please identify relevant areas or topics not covered by previous evaluation plans that should be the subject of the current evaluation. Please provide the summaries of such evaluations and studies in annex and, when available, the internet links to the documents concerned:

¹ Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty (OJ L 187, 26.6.2014, p. 1).

² SWD (2014) 179 final, 28.5.2014.

2. Objectives of the aid scheme to be evaluated³

2.1. Please provide a description of the aid scheme specifying the needs and problems the scheme intends to address and the intended categories of beneficiaries, for example size, sectors, location, indicative number:

The aid measure which is the subject of this notification, pursuant to Article 108(3) TFEU, has as an objective of common interest to promote, through public intervention, investment in ultra-wideband that achieves a level of connectivity that goes well beyond 100 Mbps and meets the European objectives of the Gigabit Society and Digital Compass. The Italian Government considers that the achievement of these objectives can only be achieved if the Strategy is fully implemented and, therefore, only if there is public intervention that also covers grey and black areas where market failures are identified⁴. While the investments being implemented in areas which, according to the 2016 mapping exercise, were necessary to achieve the objective of social inclusion in the less populated areas of the country without NGA networks, the Investment Plan which is the subject of this notification aims to promote the development in grey and black areas (as well as possible new white areas) of ultra-wideband⁵ networks and, consequently, advanced digital services, in relation to which there is a lack of interest in investing in some of the private operators. In this way, the scope of public intervention as a whole allows public resources to be used, ensuring equal opportunities for growth in all the different areas of the country. In particular, under the ‘Italy at 1 Giga’ Plan, the Italian Government will provide connectivity, under normal peak traffic conditions, to at least 1 Gbit/s download and 200 Mbit/s upload to real estate units which, as a result of the mapping of the infrastructure present or planned by market participants as of 2026, have been found not to be covered by at least one network capable of reliably delivering download speeds of 300 Mbps or more. The connection to at least 1 Gbit/s in download will be provided in principle to 200 Gbit/s. To this end, the aid measure will finance the deployment of both wired and wireless end-to-end network infrastructures⁶ capable of providing both active and passive wholesale access to third party operators.

³ Beyond providing a general description of the objectives and eligibility rules of the scheme, the aim of this section is to assess how the eligibility and exclusion rules of the scheme may be used to identify the effect of aid. In some cases, the precise eligibility rules may not be known in advance. In those cases the best available expectations should be provided.

⁴ The Commission had expressed a favourable opinion on the previous plan for white areas also on the basis of the unity of the 2015 Strategy (approach confirmed in the latest 2021 Strategy), including measures in other areas, throughout Italy (see paragraph 12 of Decision SA.41647 (2016/N) of 30 June 2016).

⁵ Indeed, the mapping carried out in 2021 showed that a small proportion of citizens still lacked NGA connectivity due to changes in private investment plans compared to those previously reported by companies.

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2. Evaluation questions

- 3.1.** Please indicate the specific questions that the evaluation should address by providing quantitative evidence of the impact of aid. Please distinguish between (a) questions related to the direct impact of the aid on the beneficiaries, (b) questions related to the indirect impacts and (c) questions related to the proportionality and appropriateness of the aid. Please explain how the evaluation questions relate to the objectives of the scheme.

The evaluation methodology capable of providing evidence of the direct and indirect impact of the aid, as well as its proportionality and appropriateness, reflects the Community guidelines, with particular reference to the common methodology on State aid assessment (SWD 2014, 179 final).

The analysis should be carried out in accordance with an evaluation approach based on quantitative ex-post evidence relating to the implementation of the aid measure and taking into account the relevant assumptions on the external factors that may have influenced the implementation of the notified scheme.

Some impacts will be analysed through the use of quantitative time indicators (ex. evolution of coverage over time) together with an international benchmark analysis — where possible — to assess in particular the proportionality of the intervention. Other objectives — more sensitive from a policy point of view — will be subject to a more specific quantitative assessment and will require the implementation of econometric analyses, which will be described in detail in Section 5.

The operational structure of the evaluation must be structured on the basis of a specific set of evaluation questions, designed to examine in greater depth all the impact areas identified in the Community guidelines, identified as follows:

1. Direct impacts:

- a) *To what extent has the aid impacted on the construction of ultra-wideband infrastructure in Italy?*
- b) *Has the aid increased the take-up of the service by end-users (households and businesses)?*

2. Indirect impacts:

- a) *What were the effects on the economic and social system of the territories concerned (e.g. local GDP or its growth? Level of take-up of digital public services)?*
- b) *To what extent has the aid provided an incentive for operators to invest in areas not yet covered by the country?*
- c) *Has operators been found to have had an incentive to underestimate their investment plans in order to secure access to publicly subsidised infrastructure?*
- d) *To what extent do wholesale access conditions applied to retail operators contribute to balancing positive and negative effects on the competitive structure of the market?*

3. Proportionality and appropriateness of the model used:

- a) *Is the size of the state aid proportionate to the coverage achieved?*
- b) *Has the intervention tool used proved to be the most effective in terms of ultra-fast network coverage?*
- c) *Given the trade-off between higher public costs and competitive openness of the proposed model, what are the results compared to other models?*
- d) *What are the main evidence in terms of the efficiency (cost) and effectiveness (connection speed and new access points) of the model used?*
- e) *Has the claw back mechanism had an impact on manufacturers/dealers seeking efficiency?*
- f) *What was the share of network builders' use of existing infrastructure and what had an impact on overall efficiency?*

3. Result indicators

4.1. Please use the following table to describe what indicators will be developed to measure the outcomes of the scheme, as well as the relevant control variables, including the sources of data, and how each outcome indicator corresponds to the evaluation questions. In particular, define: (a) the relevant evaluation question, (b) the indicator, (c) the data source, (d) the frequency of data collection (e.g. annual, monthly, etc.), (e) the level at which the data are collected (e.g. at company, establishment, regional level, etc.), (f) the population to which the data source relates (e.g. aid beneficiaries, non-beneficiaries, all enterprises, etc.).

1. Direct impacts

Evaluation question	Result indicator	Sources and Period of Observation
1.a — To what extent has the aid impacted on the construction of ultra-wideband infrastructure in Italy?	Number of citizens/housing units covered out of the Plan total	Source: Assignees Period: Quarterly
	Type of connection (FTTH/FWA) per housing unit	Source: Assignees Period: Quarterly
1.b — Has the aid increased the take-up of the service by end-users (households and businesses)?	% take-up of ultra-broadband service (<i>take-up</i>) by number/housing unit	Source: Assignees/retail operators Period: Quarterly
	% take-up by user type (households and businesses)	Source: Assignees/retail operators Period: Quarterly

2. Indirect impacts

Evaluation question	Result indicator	Sources and Period of Observation
2.a — What were the effects on the economic	Local GDP level per municipality	Source: ISTAT

and social system of the territories concerned (e.g. local GDP or its growth)?		<i>Period: Annual</i> Analysis by econometric methodology (see Section 5)
	% number of citizens/housing units covered per municipality/year	<i>Source: Assignees</i> <i>Period: Quarterly</i>
	% take-up of ultra-broadband service (<i>take-up</i>) per municipality/year	<i>Source: Assignees</i> <i>Period: Quarterly</i>
2.b — To what extent has the aid provided an incentive for retail operators, which purchase wholesale access services to the subsidised network, to invest in areas not yet covered in the country?	Pay-Back-Time (PBT)	<i>Source: Assignees</i> <i>Period: End of plan</i>
	Internal Rate of Return (IRR)	<i>Source: Assignees</i> <i>Period: End of plan</i>
	Net Present Value (NPV)	<i>Source: Assignees</i> <i>Period: End of plan</i>
	Comparison of the model used to assess investment in public tenders and that used for private investment	<i>Source: Assignees</i> <i>Period: End of plan</i>
2.c — Has operators have been found to have had an incentive to underestimate their investment plans in order to secure access to publicly subsidised infrastructure?	% deviation of plans communicated to investors and plans communicated to the Italian Government as part of the mapping carried out by Infratel through public consultations	<i>Source: Assignees/Infratel</i> <i>Period: Biennial</i>
2.d — To what extent do wholesale access conditions applied to retail operators contribute to balancing positive and negative effects on the competitive market structure?	<ul style="list-style-type: none"> • Development of retail market shares of the various operators • Range of wholesale access services • Price developments for wholesale access services 	<i>Source: Retail/Agcom operators</i> <i>Period: Annual</i>

3. Proportionality and appropriateness of the model used

Evaluation question	Result indicator	Sources and Period of Observation
3.a — Is the size of the State aid proportionate to the coverage achieved?	Investment needs by number/building units before and after plan	<i>Source: Assignees</i> <i>Period: End of plan</i>
	International benchmark on the economic level of aid in Europe	<i>Source: Assignees</i> <i>Period: End of plan</i>
	Share of reuse of existing infrastructure	<i>Source: Assignees</i> <i>Period: End of plan</i>
3.b — Has the intervention tool used proved to be the most effective in relation to ultra-fast network coverage?	Evolution of hedges in time (% of total building units)	<i>Source: Assignees</i> <i>Period: Annual</i>
	Time evolution of the demand side take up (% of total real estate units)	<i>Source: Assignees</i> <i>Period: Annual</i>

3.c — In view of the trade-off between higher public costs and competitive openness of the proposed model, what are the results compared to other models?	Investment needs (estimated and actual)	<i>Source:</i> Assignees <i>Period:</i> Annual
	Evolution of the number of retail operators present in the market	<i>Source:</i> Assignees <i>Period:</i> Annual
	Evolution of retail market shares	<i>Source:</i> Assignees <i>Period:</i> Annual
3.d — What are the main evidence in terms of the efficiency (cost) and effectiveness (connection speeds and new access points) of the model used?	Investment needs (estimated and actual)	<i>Source:</i> Assignees <i>Period:</i> Annual
	Causal analysis between infrastructure deployment and end-user take-up	Analysis by econometric methodology (see Section 5)
3.e — Has the claw back mechanism had an impact on manufacturers/dealers seeking efficiency?	Evaluation of outturn costs in relation to the estimated costs	<i>Source:</i> Assignees <i>Period:</i> End of plan
	Benchmarks on claw back clauses in other European countries (where data are available)	<i>Source:</i> Assignees <i>Period:</i> End of plan
3.f — What has been the share of network builders' use of existing infrastructure and what impact did it have on overall efficiency?	Share (%) of reuse of existing infrastructure	<i>Source:</i> Assignees <i>Period:</i> End of plan

Details, for each indicator, of the data source, the frequency of data collection, the level at which the data are collected and the population to which the data source relates is given in the Table. The sources of the data are further explained in Section 6 of the following document.

The guidance given in this and the previous paragraph is to be seen as guidelines for the structure of the impact assessment. The actual feasibility of the whole set of evaluation questions and indicators depends on the availability of the information available to the evaluator and on the verification of the actual relevance of the measurements. Moreover, while some targets will be quantified using simple indicators and analysing their temporal variation, direct impact analyses and some of the indirect impact analyses will require a quantitative assessment to ensure a robust analysis of the actual impact of public intervention, which can therefore only be carried out using appropriate econometric techniques analysed in Section 5.

In order to ensure that the evaluator has a sufficient range of data, the beneficiaries will be required in the calls for tenders to make available the information necessary for the evaluation. In particular, direct beneficiaries may be requested (but not exhaustively) to provide information on publicly supported network infrastructures, from *retail* operators requesting access to such infrastructure, on the technological and architectural characteristics of the subsidised networks, on possible forms of cooperation between undertakings, on the range and prices of wholesale services applied in accordance with Agcom's requirements, and on the extent to which existing infrastructure is used.

The implementing entities of the subsidised infrastructure will also be required to include in their *wholesale* service contracts a clause obliging the operators requesting access to the subsidised infrastructure to provide data on the level of coverage and take-over of services, ultra-broadband access, market shares, technological and architectural characteristics, range, prices and quality of services offered to end-users, as well as additional information relevant to the analysis of investment

plans and the model used to assess investments in the assisted areas. The frequency with which direct and indirect beneficiaries will have to provide the information requested, as well as the level of data collection, are indicated in the table above. In general, quarterly data will be required for adoption analyses, while for other analyses annual data will be used. Purely financial evaluations, on the other hand, will be assessed at the end of the Plan.

Please explain in particular why the indicators chosen are the most relevant for measuring the expected impact of the scheme.

The evaluation questions guided the identification of a set of result indicators to capture quantitative information on the results achieved by the State aid measure. These indicators, functionally linked to the questions, assess both the direct and indirect impact, including the possible effects on competition and trade, as well as the appropriateness and proportionality of the measure.

4. Envisaged methods of conducting the evaluation

5.1. In light of the evaluation questions, please describe the envisaged methods to be used in the evaluation to identify the causal impact of the aid on the beneficiaries and to assess other indirect impacts. In particular, please explain the reasons for choosing those methods and for rejecting other methods (for example, reasons related to the design of the scheme)⁷.

The use of public funds to support the construction of ultra-wideband network infrastructure must be accompanied, as requested by the European Commission, by a careful analysis of the **ex post causal effects** of such public subsidies, especially for those impacts that are deemed to be socially significant (for example, the impact on the adoption of the service or on local GDP; See below) and verify that the state aid has been **appropriate** and the expenditure **proportional** to the objective.

As regards the assessment of the **ex post impacts** of State aid, it is considered that the analysis must necessarily require a quantitative approach based on econometric methods essential to take into account the possible causal effects of public intervention.

A causality analysis requires the use of very specific econometric assessment techniques that make it possible to isolate the effect of public aid from other potential competing factors. In other words, it is not simply necessary to establish a correlation between the use of public funds, the construction of infrastructure and a specific variable of outcomes, but it must be examined in detail what causal effect public subsidies have had in achieving a certain policy objective, net of any other competing factors ('confounding factors').

⁷ See SWD (2014) 179 final of 28.5.2014.

For the evaluation of the 'Italia a 1 Giga' plan, it is considered essential to use a number of possible complementary techniques for analysis, as described below, which we believe should be analysed in order to carry out an effective (and robust) ex-post evaluation of public aid. In this paragraph we describe the methods of analysis in a general way, while the detailed description will be presented in section 5.2 below.

A first method of ex post evaluation of public aid is based on the Difference-in-Difference (DID) method. The idea is to compare the *reference outcome* (as specified in Section 5.2) in areas receiving aid, with other areas not receiving such aid, before and after the intervention. In this case, the areas that (still) do not receive the subsidies (and therefore have not yet built the network infrastructure they provide) offer a counterfactual to what would have happened without the public intervention. However, if the areas subject to the aid plan are not affected at the same time, which may be the case for example if the aid involves the construction of infrastructure at different times (staggered roll-out), the OLS estimate of the DID model may be distorted even if the shock is exogenous to the dependent variable.⁸ Recent economic literature on causative inference shows that if the effects of the shock are not subitaneous but materialise over time, the OLS DID estimator tends to give more weight to short-term effects, thereby underestimating the real impact of the subsidy. This is especially the case in the absence of a true control group, where all units will receive treatment by the end of the observation period (as in the present case).

In this case, the estimation method to be used is the "event study design" which makes it possible to study the ex-post dynamics of the intervention, so as to analyse how long the effects materialise. The event study is a generalisation of the 'static' DID model. Instead of inserting a dummy variable identifying the treatment allocation (in our case the areas subject to the public funding plan), the event study provides for the inclusion of specific dummy variables identifying the periods from the treatment assignment. The coefficients associated with these dummy variables capture the impact of the shock before and after it occurred, thus making it possible to study the ex-post dynamics of the shock. The model also allows the exogeneity of the shock to the dependent variable to be assessed.

The event study to be carried out will then include unit specific fixed effects to check for the typical idiosyncratic factors of each observed unit.

However, a potential problem in this analysis is the existence of pre-existing infrastructure at the time of the launch of the Plan by the various existing operators, as well as the existence of end-user subscriptions already signed on these broadband lines. To take this into account, it is necessary to collect data on the availability of the connection existing in the pre-plan period (e.g. existence of xDSL or FTTC connections by number/building unit, as well as the distances at OLT — Optical Line Termination — nearest or their geo-referenced location) and the possible adoption of a broadband service for each observation unit (at the level of the population number or housing unit) in the year

⁸ See the following work:

- De Chaisemartin, Clément, and Xavier d'Haultfoeuille. (2020), "two-way fixed effects estimators with Heterogeneous treatment effects." *American Economic Review* 110.9: 2964-96;
- Sun, Liyang, and Sarah Abraham (2020), 'Estimating dynamic treatment effects in event studies with Heterogeneous treatment effects.' *Journal of Econometrics*.
- Goodman-Bacon, A. (2021) "Difference-in-Differences with variation in treatment timing." *Journal of Econometrics*;
- BRusyak, Kirill, Xavier Jaravel, and Jann Spiess (2021) "Revisiting event study designs: Robust and efficient estimation." arXiv preprint arXiv:2108.12419.

preceding the start of the Plan. The use of these variables will allow on the one hand to take into account possible *confounding factors* in the estimation but also to assess the differential effect on the different outcome variables chosen on the basis of the pre-existing technology.

However, these models may also have limitations in their assessment. This is particularly the case where pre-trends are observed before the shock, i.e. if the outcome variable *already* shows a well-defined path over time prior to government intervention.

In this case, the allocation of public aid in the various areas would be related to the dependent variable (*Endogenous selection*), thus undermining the validity of the *event study* model. Where this occurs, the causal impact of the plan can be captured through an alternative approach to instrumental variables (IV), which is based on the existence of an additional variable that is related to the variable being analysed, but not related to the dependent variable. However, this methodology requires the identification of additional variables which must have particular properties and whose validity must be demonstrated.

In particular, the choice of instrument will depend on the type of outcome variables that will be implemented and which will be described in point 5.2 below, as well as the type of analysis to be carried out. In estimates using as an explanatory variable the adoption of ultra-fast connections by end-users (households and businesses), given the possible endogeneity of the latter, the availability of infrastructure in the period prior to the observation period will be used as an instrumental variable, as recently indicated in the economic literature.⁹ For other outcome variables, such as in the case of an analysis of the causal relationship between infrastructure investment and the level or change in local GDP, the instrument variable eroded may not be valid; In this case, it is intended to use geographical variables measuring the physical distance between municipality and ultra-fast network nodes, as widely used in recent literature.¹⁰

The above approaches (*event studies* and analyses with instrumental variables) are to be seen as complementary in order to provide robust evidence on the causal impact of public aid for the development of digital infrastructure in Italy.

In addition to this analysis of the ex-post impact of public intervention, the analysis also includes an assessment of the **appropriateness** and **proportionality** of the intervention.

The level of appropriateness will be assessed by looking at how output variables evolve over time according to the degree of infrastructure deployment. This correlation will be assessed both by simple qualitative indicators as set out in Section 3 and by the results of the causation analyses described

⁹ See the work of Bhuller, M., Havnes, T., Leuven, E., & Mogstad, M. (2013). For Broadband Internet: An information highway to sex crime?. *Review of Economic Studies*, 80 (4), 1237-1266.

¹⁰ See the following work:

- Nardotto, Mattia, Tommaso Valletti, and Frank Verboven. (2015) "Unbundling the incumbent: Evidence from UK broadband." *Journal of the European Economic Association* 13.2, 330-362.
- Campante, Filipe, Ruben Durante, and Francesco Sobbrino. (2018), "Politics 2.0: The multifaceted effect of broadband internet on political participation." *Journal of the European Economic Association* 16.4: 1094-1136.
- Miner, Luke. (2015), 'The unintended consequences of Internet diffusion: Evidence from Malaysia.' *Journal of Public Economics* 132: 66-78.
- Cambini, C., Sabatino, L., (2021). Digital Highways and Firm Turnover, mimeo.

above. If, therefore, the econometric analysis shows that the deployment of ultra-fast infrastructure encouraged by the Plan has a positive and significant impact on the take-up of the service by end-users, there may be a direct indication as to the appropriateness of the measure in relation to the outcome chosen.

It will of course also be necessary to check whether this intervention has led to excessive spending in relation to the target. In order to assess the proportionality of the measure, reference will be made to an international benchmark analysis using data on similar public intervention cases carried out in other European countries, subject to the availability of data when this analysis is carried out.

The feasibility of the evaluation plan depends on the implementation of the scheme as planned and on the availability of data. If, for whatever reason, the implementation deviates from the provisions, the Italian authorities undertake to contact the Commission as soon as possible in order to be able to define an alternative evaluation strategy which is in line with the principles of the Common Methodology for State aid evaluation.

5.2. Please describe precisely the identification strategy for the evaluation of the causal impact of the aid and the assumptions on which the strategy relies. Please describe in detail the composition and the significance of the control group.

The quantitative analysis of causality will be limited to an analysis of the impact on specific measures which are considered most relevant from a policy point of view and which concern both direct and indirect impacts of investment in ultra-wideband network infrastructures on areas not yet covered by State aid in Italy.

It should be borne in mind that the timescales for the deployment of ultra-wideband networks will be strictly defined in the calls for tenders and will reflect the milestones already provided for in the Italian NRR (Mission 1).

The deployment of ultra-wideband infrastructure can have important direct and indirect impacts on a number of economic variables. The outcome variables chosen to assess the Italian Plan at 1 Giga are as follows:

- (a) the take-up of ultra-broadband services, differentiated for end-users/households and businesses;
- (b) local GDP (or GDP growth) at the level of individual municipalities.

As regards point (a), it is proposed to take advantage of the staggered nature of the installation of the infrastructure in an *event study* model, where the areas covered will be those that receive the subsidiary infrastructure over time. The model will include fixed effects at the level of individual housing units and *two-way fixed effects*, as well as checks on the pre-existence of fixed broadband connections other than those under analysis. Information will also be requested on the existence, for each housing unit, of broadband subscriptions by telephone operators. The model will be assessed both in relation to all final customers and by separating the analyses for households and business users.

Given that a public intervention plan is being considered, we do not expect problems of endogeneity (as also highlighted in other academic work)¹¹ nor the presence of confounding factors that could influence the installation of the new infrastructure and end-user uptake.

¹¹ See Akerman, Anders, Ingvil Gaarder, and Magne Mogstad. (2015), 'The skill complementarity of broadband internet.' *The Quarterly Journal of Economics* 130.4: 1781-1824.

Should the Government decide to intervene with further policies through, for example, the issuing of vouchers to encourage the migration of end-users to ultra-fast connections, it will be possible to carry out robustness and sensitivity analyses taking into account these exogenous shocks in the regression analysis. Alternatively, falsification tests (placebo test) may be used¹² where treatment is assigned prior to the actual installation of ultra-fast infrastructure, so as to verify the absence of the effect of false treatment.

The observation unit of this analysis will be at the housing unit level, with a quarterly frequency. For the presence of pre-existing infrastructure, data from 2021 linked to the mapping carried out by Infratel will be used, while for adoption data prior to the start of the plan data for at least 2/3 years prior to the start of operations of the Plan.

As regards point b), the assessment of the impact of the Plan on local economic growth will be analysed with two types of analysis.

A first analysis (b.1) will aim to study the relationship between adoption of ultra-fast services and local economic growth (i.e. in terms of both the level of aggregate GDP, GDP per capita, or change in GDP).

However, given the fact that the adoption of the service may take longer, given the meticulous demand side for the adoption of ultra-fast connections, it is considered important to carry out a second analysis (b.2) which will carry out an analysis of the direct impact of ultra-fast network investments on local GDP (in its three definitions above, i.e. in terms of aggregate level, GDP per capita and growth).

As stated above, these analyses will first be carried out using the event study method together with analysis at VS in order to take proper account of any endogeneity between variables.

As regards the analysis of the impact of adoption on GDP (case b.1), as the adoption of the service may have endogeneity problems, it will be instrumented using the availability of infrastructure at the previous time of the unit observed, as indicated in the previous paragraph and used in Bhuller et al. (2013).

On the other hand, as regards the analysis of the direct impact of investments in ultra-fast networks on GDP (point b.2), the endogeneity of investments must first be assessed on the basis of the existence of the event study and where the analysis indicates the presence of possible endogeneity, geographical measures of distance from the city to the local and/or national nodes of the network will be used as an instrumental variable. This physical distance variable is also used in numerous recent studies on the sector (see footnote 7 and in particular the work of Campante et al., 2017; Cambini and Sabatino, 2021), makes it possible to provide a *proxy* for the cost of building an ultra-fast network per type of area covered.

For both analyses, the observation unit will be the municipality and therefore it will be necessary to aggregate the adoption data on a municipal basis. The estimation model will include fixed effects at municipality and time unit level (*two-way fixed effects*), as well as checks on the pre-existence of fixed broadband connections other than those under analysis, on the pre-existence of broadband commercial

¹² See, for example, GAVAZZA, Alessandro, Mattia Nardotto, and Tommaso Valletti. (2019) "Internet and politics: Evidence from UK local elections and local government policies." *The Review of Economic Studies* 86.5: 2092-2135.

contracts by users and other control variables at municipal level such as the degree of urbanisation, the number of graduates and the demographic composition of the municipality (from ISTAT source).

Standard robustness and sensitivity checks will complement empirical analysis to assess the robustness of the results obtained. With regard to *event studies*, reference will be made to the tests that are now well established in the literature¹³. With reference to the VS, the validity of the instrument will be tested through reduced form regressions and the absence of bias due to *weak instruments*.

Given the need to aggregate data at municipal level, the data requested will in this case have an annual frequency, so that a match can be made with the municipal GDP data available from ISTAT, which will have to be collected separately. For an appropriate time analysis, GDP data up to 2/3 years before the start of the Plan (i.e. 2019-2021) will be used, although it will be necessary to address the year 2020 in particular due to the economic shock due to the COVID-19 pandemic. Alternatively, only the data from the year 2021 prior to the implementation of the plan will be used.

As regards the data on municipal hedges and technologies available on 2021 (i.e. before the Plan was launched), reference may be made to the mapping data carried out by the Government through Infratel, and to the data of the Communications Guarantees Authority. The pre-existing data for adoption, for at least the year preceding the plan programme, must be requested from retail operators.

¹³ See, in addition to the above mentioned articles:

- Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. (2004) 'How much should we trust distinct-in-differences estimates?' *The Quarterly journal of economics* 119.: 249-275.
- Malgouyres, Clément, Thierry Mayer, and Clément Mazet-Sonilhac. (2021) "Technology-induced trade shocks? Evidence from broadband expansion in France." *Journal of International Economics* 133.

5.3. Please explain how the envisaged methods address potential selection bias. Can it be claimed with sufficient certainty that observed differences in the outcomes for the aid beneficiaries are due to the aid?

The terms of objectivity of the assessment will be ensured by defining appropriate comparison bases, to be used as control samples to assess the causal impact actually attributable to the notified aid measure, in accordance with the methodology described in the preceding paragraphs.

Considering that the causal impact represents the difference between the result obtained with the aid and that which would have been achieved in the absence of the aid, its correct identification ensures that the observed differences in the results between the beneficiaries of the aid are indeed due to the granting of the aid.

It should be borne in mind that State aid will be granted only and exclusively for civic numbers and housing units belonging to so-called 'grey areas' which tend to be similar from the point of view of the population density and average income of the resident population. However, following the existing literature (see articles by Campante et al., 2017 and Cambini and Sabatino, 2021), to ensure the robustness of the results, specific time trends will be added based on the demographic characteristics of the areas under analysis.

However, as shown above, a potential problem in the empirical analysis may arise from the presence of a pre-existing broadband infrastructure at a lower speed in the treated areas. Estimates of *event studies* and with instrumental variables that have been proposed are structured to check for the combination of lower-speed technologies. Nevertheless, in order to verify the validity of the results obtained, analysis — where necessary — with spatial econometric models (e.g. *boundary discontinuity design*) as used in recent economic literature could be complementary.¹⁴

5.4. If relevant, please explain how the envisaged methods intend to address specific challenges related to complex schemes, for example schemes that are implemented in a differentiated manner at regional level and schemes that use several aid instruments:

The notified measure will be implemented by means of a single intervention model (gap funding), therefore, the assessment will have to take into account only any specific intervention at municipal and regional level.

5. Collection of data

6.1. Please provide information on the mechanisms and sources for collecting and processing data about the aid beneficiaries and about the envisaged counterfactual

¹⁴ Ahlfeldt, Gabriel, Pantelis Koutroumpis, and Tommaso Valletti (2017), 'Speed 2.0: Evaluating access to universal digital highways. "Journal of the European Economic Association 15.3: 586-625

situation¹⁵. Please provide a description of all the relevant information that relates to the selection phase: Data collected on aid applicants, data submitted by applicants and selection outcomes. Please also explain any potential issues as regards data availability.

As regards the econometric/quantitative analysis referred to in point (a) — Section 5.2 described above, i.e. the relationship between infrastructure deployment and end-user take-up, the following information must be collected from the operator (s) who will be awarded the tender lots:

- Data on the infrastructure deployment of individual lines (deployments) at the most detailed level possible (geolocalised number or housing unit). Period: From the start of the plan forward. Frequency: Quarterly.
- Data on contracting ultra-wideband connectivity services on new lines installed as detailed as possible (geolocalised number or housing unit). Period: From the start of the plan forward. Frequency: Quarterly.
- Information on the technological and architectural characteristics of the networks deployed (e.g. FTTH, FWA,...).
- Geolocation of central office/OLT (central office/OLT) as an endpoint of the telephone operator.

In order to take into account the possible pre-existence of broadband (but not ultra-fast) network connections and previous end-user subscriptions, it is also necessary to ask for:

- Information on the type of connection pre-existing to the house number/housing unit before the start of the Plan, i.e. at the end of 2021; This information will be requested from Infratel, which has carried out a full mapping of the connections existing in the pre-Plan phase;
- Information on the existence of broadband subscriptions by telephone operators for each housing unit/number. For these types of data it is desirable to have data for at least 2/3 before the start of the Plan (i.e. for the period 2019-2021); Where such data are not available, the request will cover at least the year 2021 (i.e. for the 4 quarters of that year).

The reference unit is the real estate unit or house number and is intended to collect *quarterly* information, broken down by type of user (residential or business).

Below is a summary table which includes the types of information requested:

¹⁵ Please note that the evaluation might require sourcing of both historical data and data that will become progressively available during the deployment of the aid scheme. Please identify the sources for both types of information. Both types of data should preferably be collected from the same source so as to guarantee consistency over time.

<i>Civic</i>	<i>Common</i>	<i>Existing pre-plan connection</i>	<i>Existence of pre-plan broadband and subscription</i>	<i>Latitude</i>	<i>Longitude</i>	<i>Date of implementation of ultra-broadband connection</i>	<i>Technological and architectural characteristics (e.g. FTTH, FWA)</i>	<i>Date of subscription of ultra-wideband connectivity service end-user</i> * °

* differentiated by residential and business users

Where there is more than one household referring to the same number/real estate unit, the percentage of subscribers in relation to the total number of households belonging to the same household shall be reported.

With regard to the analysis referred to in points b.1 and b.2) — Section 5.2, the data will have an *annual* dimension as it is intended to carry out an assessment of the impact of the adoption and implementation of infrastructure on local GDP as measured on an annual basis. These figures are as shown in the following table:

<i>Year</i>	<i>Common</i>	<i>% Pre-Plan broadband connections</i>	<i>Ultra-broadband connections (No of lines built or number of citizens covered)</i>	<i>Number of OLT * installed</i>	<i>Geolocation OLT * installed</i>	<i>Technology installed (FTTH, FWA, other)</i>

* Optical line terminal

For all the various quantitative objectives set out in Section 4, data collection will be carried out through an integrated process of comparison and validation between primary sources, supplemented by various secondary sources to further ensure the consistency of the analyses to be carried out and the results obtained.

The primary sources are as follows:

- **Italian Government (with the support of the implementing body)** to find information and documentation on the selection of target areas; Definition of investment needs; Procedures for consultation and selection of beneficiaries; Projects under implementation; Monitoring processes; Projects supporting basic and ultra-wideband broadband networks under previous schemes; Opinions obtained from AGCom and AGCM, any other relevant information.
- **Beneficiaries of the aid for the construction of the network**, for information on the investment projects submitted in the context of the tender procedure, with particular reference to the planned and actual costs incurred; The state of play of the projects; Authorised services for third party operators; Technological and architectural choice; Use of existing infrastructure.

Where the aid beneficiary is the entity that constructs and operates the subsidised network but does not provide retail services, the information it is required to provide shall be understood as being integrated.

- **Retail operators, which purchase wholesale access services to the subsidised network**, to gather information on: Coverage and take-over level of services; Ultrabroadband accesses; Connection speed; Market share; Technological and architectural characteristics; The range, prices and quality of services offered to end-users, as well as additional information useful for the analysis of investment plans and for comparing the model used to assess the investments in the aided areas and that used for private investment, including the NPV of the assisted areas with the NPV of the areas in which they invest privately without aid.
- The **Federato delle Infrastrutture National Information System (SINFI)**, for information on the infrastructure available on the ground.
- **AGCOM**, with reference to the database of all existing internet access networks on the national territory, their level of demand and the quality of service offered.

The primary sources will be accompanied by the following derived sources (non-exhaustive list), which are useful to further ensure the consistency of the analyses carried out and the results obtained:

- **Electronic communication operators**, with particular reference to official communications by operators to the Authority and to the financial markets.
- **AGCOM**, with particular reference to the guidelines for conditions for *wholesale* access to publicly funded ultra-wideband networks, market analyses and observatories, as well as conditions for the provision of wholesale services.
- **National Institute of Statistics (ISTAT)**, with particular reference to socio-demographic and economic data at municipal and regional level, as well as surveys on the dissemination of ICT in households and businesses.
- **Banca d'Italia**, mainly in relation to statistics on the main indicators of the Italian economy and household and business surveys.
- **Local authorities** to find information on the areas covered by the intervention.

6.2. Please provide information on the frequency of the data collection relevant for the evaluation. Are observations available on a sufficiently disaggregated level, that is to say at the level of individual undertakings?

The primary sources referred to in the previous paragraph shall be able to provide information with a frequency of recognition and a level of territorial detail appropriate for the purpose of the assessment.

In addition, the collection of information and data involves the use of different ways, including:

- Send checklists and structured questionnaires to the key entities mentioned above.
- Interviews with project managers, both on the contracting authorities' side and on the beneficiaries' side.
- Meetings with representatives of the main institutions (e.g. AGCOM, AGCM, MITD, MISE).

6.3. Please indicate whether access to the data needed to conduct the evaluation might be hindered by laws and regulations governing the confidentiality of data, and how those

issues would be addressed. Please mention other possible challenges related to data collection and how they would be overcome.

Data collection procedures will be defined in such a way as to ensure full compliance with existing national and Community legislation.

Access to information sources will take place in the context of a codified procedure, which will allow the specific conditions of confidentiality and use of each data element to be formally defined, together with the entity that owns them.

6.4. Please indicate whether surveys of aid beneficiaries or of other undertakings are foreseen and whether you intend to use complementary sources of information.

In the context of appropriate fact-finding enquiries, additional information may be requested from (direct and indirect) beneficiaries of aid and, at least, on:

- a) Investment plans prior to the measure;
- b) Models for the assessment of investment plans;
- c) Investments in the implementation of projects;
- d) Project enabled market potential;
- e) The state of play of the projects;
- f) Authorised services for end users and third party operators;
- g) Previous experiences of co-financed broadband and ultra-wideband projects.
- h) Assessment of specific aspects of the measure.

6. Proposed timetable of the evaluation

7.1. Please indicate the proposed timeline of the evaluation, including milestones for data collection, interim reports and participation by the parties concerned. If relevant, please provide an annex detailing the proposed timeline.

The evaluation timetable will be structured according to the following activities:

1. Evaluation of tender procedures, consisting of an analysis of factors relating to participation, successful tenders, characteristics, models chosen, etc.
2. Evaluation of progress and activation, consisting of an analysis of elements relating to the timing and methods of activating the services, any problems, etc.
3. Final evaluation of the progress of infrastructure outputs, activations and management, with particular reference, in addition to the elements of previous evaluations, to the analysis of elements relating to the impact of services, *claw back*, activation, etc.

There are dedicated steps on data collection, interim reports and sharing with stakeholders.

7.2. Please indicate the date by which the final evaluation report will be submitted to the Commission.

The first evaluation will be sent to the European Commission at the latest two years after the adoption of the decision and will focus on the analysis of the compatibility of the calls for tenders with the relevant Community guidelines as well as with the notified aid scheme. An initial analysis of the impact of the measure will also be carried out, referring to the first measurable evidence.

The second step focuses on the assessment of the direct and indirect impacts of the measure in the medium term and the documents will be sent to the Commission at the latest four years after the adoption of the decision.

The final evaluation will be sent to the Commission by 31 June 2027.

7.3. Please mention factors that might affect the envisaged timeline.

The actual launch of tendering procedures is one of the factors that may affect the implementation of the planned timetable.

7. The body conducting the evaluation

8.1. Please provide specific information on the body conducting the evaluation or, if not yet selected, on the timeline, procedure and criteria for its selection.

In line with the *Commission Staff Working Document, Common methodology for State aid evaluation*, in order to identify an entity with proven experience and independence with the necessary expertise, an entity (public or private) will be selected that is functionally independent of the government authorities (e.g. Belonging to statistical offices, central banks, accounting judges, public or private universities and research centres).

The entity will be selected following a careful evaluation of the curriculum demonstrating experience, competence and independence, as well as greater compliance with the requirements of the contracting authority.

8.2. Please provide information on the independence of the body conducting the evaluation and on how possible conflicts of interest will be excluded during the selection process.

The information will be provided following the selection of the body in charge of the evaluation.

8.3. Please indicate the relevant experience and skills of the body conducting the evaluation or how those skills will be ensured during the selection process.

The information will be provided following the selection of the body in charge of the evaluation.

8.4. Please indicate what arrangements the granting authority will make to manage and monitor the conduct of the evaluation.

Following on from the evaluation process of previous aid schemes, the coordination of evaluation activities will be ensured by setting up a Steering Committee, in which the Project Manager will participate.

The Steering Committee will ensure the overall quality of the activity and compliance with the foreseen emphasis. Periodic progress monitoring will be carried out within the Steering Committee and relevant decisions on the operation of the project will be taken. At the same time, the Steering Committee will define priorities and assess the need to launch any recovery plan to ensure compliance with the timing and quality of the activity.

8.5. Please provide information, even if only of an indicative nature, on the necessary human and financial resources that will be made available for carrying out the evaluation.

The information will be provided following the selection of the body in charge of the evaluation.

8. Publicity of the evaluation

9.1. Please provide information on the way the evaluation will be made public, that is to say, through the publication of the evaluation plan and the final evaluation report on a website.

The Italian Government undertakes to publish the evaluation plan and the final evaluation report on its institutional website.

9.2. Please indicate how the involvement of stakeholders will be ensured. Please indicate whether it is planned to organise public consultations or events related to the evaluation.

Through the Ministry of Digital Transition, regional administrations, local authorities, telecommunications operators and other economic operators active in the TLC sector will be invited to contribute by completing a questionnaire on the implementation of the State aid scheme, as carried out in the context of the evaluations of the previous notified measures.

9.3. Please specify how the granting authority or other bodies intend to use the evaluation results, for example for the design of successors of the scheme or for similar schemes.

The results of the evaluation will be used to define how the notified measure, which is expected to be effective until 2026, will continue in order to increase its overall effectiveness and reduce its negative

impact on the market and trade.

9.4. Please indicate whether and under which conditions data collected for or used for the evaluation will be made accessible for further studies and analysis.

Access to information sources will be granted subject to the conditions of confidentiality and use of each data element, as defined during the collection phase by the entity that owns it.

9.5. Please indicate whether the evaluation plan contains confidential information that should not be disclosed by the Commission:

The information contained in this evaluation plan, including Annexes 2 and 3, is to be considered strictly confidential.

9. Other information

10.1. Please indicate here any other information you consider relevant for the assessment of the evaluation plan:

No additional information relevant to the notification of this evaluation plan is identified.
We confirm our willingness to provide any clarifications and additions, depending on the additional information needs identified by the European Commission during the evaluation of the plan.

10.2. Please list all documents attached to the notification and provide paper copies or direct internet links to the documents concerned:

The following documents are attached to this notification form: