Summary of Discussion Points

Presented by the Business and Industry Advisory Committee to the OECD (BIAC) to the OECD Competition Committee Roundtable on

"The Role and Measurement of Quality in Competition Analysis"

19 June 2013

The Business and Industry Advisory Committee (“BIAC”) to the OECD appreciates the opportunity to submit these comments to the OECD Competition Committee for its roundtable on the "Role and Measurement of Quality in Competition Analysis" on 19 June 2013.

I. Background

1. This is an important but somewhat elusive topic. Businesses invest substantial amounts of money, intellectual capital, time and effort to improve quality and thereby achieve greater competitiveness. Competition agencies should take proper account of this important parameter of competition. Undoubtedly quality issues are often relevant to market analysis and to understanding competitive effects within markets, particularly in the case of markets involving differentiated products or services. In some cases, multiple quality factors may be relevant to a proper understanding of the actual functioning of a particular market.

2. BIAC appreciates that quality and quality competition, in addition to price-competition, can be an important variable in certain specific settings, whilst in others it is much less so. There is thus in general little room for quality competition in markets where products are homogeneous. In contrast, quality competition is likely to be more important in differentiated product or service markets.

3. So as to respond most effectively to this wide ranging topic within the compass of a relatively short paper such as this, BIAC sets out below its general responses to the key issues raised in the Request for Contributions. However, in an effort to get beyond the headline points, we also provide in the Attachment a more detailed commentary on how quality issues have been applied by regulators in the Telecommunications Industry by way of empirical example. BIAC offers this example mainly for illustrative purposes though we believe it provides useful guidance in response to a number of the questions raised in the context of this Roundtable.
II. Definition of Quality

4. BIAC does not believe that any single definition of quality would be meaningful or useful in the context of a competition law analysis. Its relevance will vary according to the nature of the particular market concerned. Most commonly, but not in every case, it will be factored into the price of the relevant product or service. This is particularly true in the case of consumer markets for differentiated products or services. Quality can, however, influence other factors, such as:

- longevity (durability) maintaining dimensions or appearance for longer periods;
- reliability - lower failure or defect rates;
- design - style, aesthetics, appearance;
- performance - quicker, quieter, more effective etc;
- location - availability, convenience, spread;
- safety - increased margins above minimum safety requirements.

5. BIAC does not believe that choice should necessarily be treated as an element of quality since it is not an element of the intrinsic quality of the products themselves. Indeed, whether consumers have and can exercise sufficient choice depends first and foremost on the nature of the product (differentiated or homogeneous), the market structure, the decision of existing and new suppliers to offer a variety of products, and the information made available to consumers. Assuming that the notion of quality implies that suppliers may vary the quality of their products by enhancing their attractiveness for consumers, the notion of choice is a separate albeit related concept in that respect. BIAC notes that at the distribution level offering a broad range of choice may be a factor by which businesses such as supermarkets or the shoe retailer referred to in the Secretariat paper strive to distinguish themselves but choice remains an element which is separate from the intrinsic quality of the products themselves.

6. BIAC also takes the view that a possible (observed) reduction of choice in a particular setting is not in and of itself indicative of an antitrust concern, let alone a violation. Indeed, in cases where consumers are faced with less choice as a result of a particular business conduct, traditional price-based analysis is likely to suffice to identify the existence of an antitrust violation. For instance, if a dominant firm would engage in anticompetitive foreclosure strategies and, as a consequence, eliminate an important competitor that offers consumers additional choice, agencies would ordinarily be able to conclude that the excluding firm has acted anticompetitively by looking at the price effects that the exclusion of the competitor has brought about. Whether the conduct has, in addition, also led to reduced consumer choice, is in this setting irrelevant. By the same token, a reduction of choice offered may, for example, enhance production efficiency to the benefit of consumers and so BIAC takes the firm view that a mere reduction of choice without any price-based evidence, would be an insufficient basis for antitrust intervention.

III. Measurement of Quality

7. In competitive markets, particularly in the case of differentiated products or services, firms compete on both quality and price, eventually reaching an equilibrium in which the differential in quality is expressed as a function of price. Goods of different qualities are related on the demand side because consumers can substitute among
them, making a trade-off between quality and price. In the hypothetical case involving a monopolist of multiple grades of products, the producer must take into account not only the quantities to be produced, but also the issue of demand substitution among grades of goods. The monopolist therefore must decide on the quality of each product along the spectrum based on the demand interrelationships among the goods it offers for sale. Relatedly, in the case of a competitive market, each producer must set its price based on the perceived quality of its product relative to its competitors' offerings. Only where the price of the product is fixed, for example in a regulated market, is quality likely to become the main dimension of competition among suppliers.

8. The most fundamental form of qualitative analysis is the consideration of the cross-elasticity of demand among competing products, which measures the change in demand for one product resulting from the change in price of another. Whilst cross-elasticity (and indeed own-elasticity) of demand is difficult to quantify, recent economic theory has introduced the evaluation of sales diversion among products as a substitute for evaluating cross-price elasticity of demand. Techniques which permit the assessment of vast quantities of sales data, typically "scanner data" from retail transactions, allow economists to estimate the rate at which consumers shift sales from one product to another in light of relative price changes. This reflects the assessment of the degree to which consumers are likely to make a trade-off between (perceived) quality and price.

9. The US Horizontal Merger Guidelines ("the US Guidelines") also note that it may be possible to quantify these factors:

"In some cases, the Agencies may seek to quantify the extent of direct competition between a product sold by one merging firm and a second product sold by the other merging firm by estimating the diversion ratio from the first product to the second product. The diversion ratio is the fraction of unit sales lost by the first product due to an increase in its price that would be diverted to the second product."

10. Measuring competition can be particularly challenging and is the main reason why quality considerations/qualitative efficiencies are rarely taken into account. Thus, the European Commission in its Intel prohibition decision explained that:

"909. […]the concept of ‘quality adjusted’ price is a very subjective notion […] they are particularly difficult to measure in high technology industries: - it has

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2 Idem.
been very difficult to estimate the value of improvements or deteriorations in products, such as computers, semiconductors, and so forth manufactured by companies included in "high-tech" industries. These industries may frequently develop new products that are technologically superior and cost less’ […]

1691. […] There is no single parameter which defines the quality of a product, in particular such a complex product as a x86 CPU. Shortfalls in certain characteristics can be made good by performance in other fields, for instance price […]"

11. BIAC acknowledges that accurately defining and quantifying quality is in and of itself a complicated task carrying with it the inherent risk of inaccurate measurement which, in turn, brings into question the reliability of the analytical conclusions which might be reached. Moreover, the quality of a product or service is a subjective factor; agencies and consumers may disagree on the importance these quality-related factors should play in any assessment. Accordingly, if and to the extent competition agencies would find it necessary to explicitly rely on quality-related factors, BIAC submits that the application of competition law would benefit from a clear definition of the quality attributes of the products or services at hand that the agency would consider important in the analysis. In those particular cases, the analysis should, in BIAC’s view, make clear why conventional antitrust analyses based on quality-adjusted prices would not suffice. In addition, any such analysis should clearly distinguish between the quality-attributes of the products themselves, and extraneous factors, such as choice, variety and the circumstances in which the products are offered to consumers. Indeed, these latter factors do not determine the intrinsic quality of the products at hand.

12. As a result of the complexities involved in defining the notion of quality and measuring its importance, it can be difficult to accurately, reliably and consistently factor quality-related considerations into the analysis of business transactions under competition law. In most cases, however, there is little or no need to do so, as prices will reflect the varying qualities of the products in a given market. BIAC believes that in the vast majority of cases, prices will reflect consumers’ preferences and will, as such, reflect the value that consumers attach to the quality of products. This implies that in most cases the antitrust analysis can be based on a rigorous analysis of the competitive interaction between products with different quality attributes. Indeed, an analysis of the closeness of competition between differentiated products in - for instance the market for meat, sports drinks, medical instruments - will enable competition agencies to arrive at accurate predictions of how competition has been or will be affected by a particular business transaction. Thus, in many cases, conventional econometric analyses are likely to result in reliable and useful outcomes.

13. The OECD Secretariat Paper on this topic identifies a few examples of markets which might be considered exceptional in justifying a quality factor lead in assessing the impact of a proposed transaction on competition and BIAC is aware of a small number of cases in various jurisdictions in which such issues have arisen. BIAC notes that in a number of such cases the market in question lacks transparency to consumers (e.g., for medical services where the consumer is not in a position to evaluate the relative quality of the services or drugs provided). BIAC does not believe that the existence of such cases justifies any significant change in
competition analysis techniques and has concerns that the unintended consequence of the search for increased accuracy and "analytical sophistication" in such cases may be increased uncertainty and predictability of competition regulatory outcomes. Equally, for similar reasons, BIAC has reservations about the application of quality factors in actually defining markets even in cases of rapid technological change.

IV. Quality in Various Competition Law enforcement contexts

14. As regards collusion, it is generally accepted that when factors other than price influence consumer choices - non-price attributes (e.g., quality, service, information, features, etc) not only complicate collusive schemes that do arise, but also may make collusion less attractive from the outset. Non-price elements may thus make the avoidance of price coordination both feasible and attractive and consumer welfare enhancing. However, the implications of this phenomenon should not be over-stated and so, for example, mergers that reduce non-price competition may make price competition more intense and for that reason should be welcomed and not treated with suspicion because they may also, theoretically, make collusion more likely.

15. The US Guidelines address the extent to which non-price factors can complicate coordination indirectly, though in a relatively way, stating that:

"A market typically is more vulnerable to coordinated conduct if each competitively important firm's significant competitive initiatives can be promptly and confidently observed by that firm's rivals. This is more likely to be the case if the terms offered to customers are relatively transparent. Price transparency can be greater for relatively homogeneous products".

16. The US Guidelines expressly identify improved product quality as a cognizable form of efficiency in competitive effects analysis:

"Efficiencies also may lead to new or improved products, even if they do not immediately and directly affect price".

17. The US Agencies recognize that:

"'Efficiencies' in the form of quality improvements also may be sufficient to offset anticompetitive price increases following a merger. Because a quality

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8 K. Judd, Credible spatial pre-emption, 16 RAND J. of Econ. 153-166 (1985). Judd reacted to the anticompetitive "product proliferation" theory advocated during the RTE Cereals case by the FTC's expert, Richard Schmalensee. Judd noted that when entry occurs in a packed space, multiproduct incumbents may find it most profitable to withdraw from the segment that has been entered, making a product-proliferation strategy non-credible. In essence, firms with the ability to differentiate may soften price-competition by doing so and, so, have less reason to collude on price, given both the greater complexity of doing so in a differentiated product space and the costs they will bear upon detection and punishment (public and/or private). An extension of Tirole's observation is the more recent "escape competition" explanation for R&D investments.
9 US Guidelines at §7.2
10 US Guidelines at §10.
improvement involves a change in the product attributes, a simple comparison of pre- and post-merger prices could be misleading".\textsuperscript{11}

18. By the same token, the US Guidelines note that the opposite effect may occur:

"\textit{purported efficiencies claims based on lower prices can be undermined if they rest on reductions in product quality or variety that customers value}".\textsuperscript{12}

19. BIAC is nevertheless concerned that quality considerations are ill-defined in merger control law and may potentially lead to false positive findings of anticompetitive mergers. In particular, merger control efficiencies - especially qualitative efficiencies - are rarely accepted and have rarely resulted in a merger presenting anti-competitive effects being cleared. Moreover, in practice, the European Commission appears to only rely on quality considerations in order to support findings of lessening of competition (see for instance Nokia/Navteq where the European Commission considered that the proposed transaction may not only lead to an increase in price but also to a degradation in the quality of the maps provided to third parties).\textsuperscript{13}

20. One case in which quality related efficiencies were properly recognised by the US FTC was the merger between Genzyme and Ilex Oncology in 2004.\textsuperscript{14} Ilex had an FDA-approved oncology product called Campath that was also used off-label in the solid organ transplant field. Genzyme did not compete with Campath in oncology but had the next-closest substitute product for solid organ transplant. The Commission staff investigated the parties' efficiency claims and concluded that the merger would likely improve Campath's quality and breadth of treatment in oncology.\textsuperscript{15} The Merger was approved, with remedies tailored to allow the company to achieve these quality-related efficiencies whilst alleviating other competitive concerns.

21. In its Article 101(3) Notice,\textsuperscript{16} the European Commission expressly refers to improving the quality of a product and creating a new product as examples of efficiencies capable of countering a finding of infringement and these are commonly referred to as "qualitative efficiencies" as opposed to "cost efficiencies". The European Commission further explains in its Article 101(3) Notice that:

\begin{quote}
\textit{in the case of claimed efficiencies in the form of new or improved products and other non-cost based efficiencies, the undertakings claiming the benefit\textsuperscript{17}}
\end{quote}

\begin{flushright}
\textsuperscript{12} Idem.
\end{flushright}
of Article [1011(3)] must describe and explain in detail what is the nature of the efficiencies and how and why they constitute an objective economic benefit.”

22. Despite this apparently open door, qualitative efficiencies are rarely successfully relied upon *inter alia* due to the high burden of proof set by the European Commission and national agencies as well as the lack of detailed guidelines.

23. BIAC notes that as a welcome exception to this general scepticism certain vertical restraints are more regularly recognised as having a positive effect on quality. Indeed, this effect has been clearly identified in relation to restraints that limit intrabrand competition, including territorial restraints, selection distribution and minimum RPM: by lessening intrabrand competition, a supplier will encourage dealers to compete on quality. BIAC is in favour of a policy that supports these types of restraints subject to the proviso that interbrand competition is safeguarded.

24. As regards cases involving unilateral conduct, regulatory agencies are sometimes tempted to attach importance to the quality of products, particularly of potentially foreclosed competitors as an aggravating factor. For instance, in the *Microsoft* case, the European Commission examined how Microsoft’s Windows Media Player compared in terms of quality to other media players on the market. Yet quality is seldom accepted as a justification for unilateral conduct. Thus in *Intel*, the Commission rejected Intel’s claim that it could not have foreclosed AMD as the latter was unable to satisfy customer needs and went on to assess the quality of AMD’s products (see paras. 1693 to 1716). In its prohibition decision, the European Commission also made reference to the fact:

> “end-customers were artificially prevented from choosing other products on the merits (price and quality of the respective x86 CPUs) ... As such, Intel's exclusionary practices had a direct and immediate negative impact on those customers who would have had a wider price and quality choice if they had also been offered the product of their favourite OEM and/or retailer with x86 CPUs from Intel's competitors.”

### V. Conclusions

25. The evaluation of quality arises organically in several aspects of competition law. It is or at least should be an important aspect of any competition law review. In some cases, qualitative techniques have been developed to allow competition authorities to quantify the significance of quality differences. Applying economic analysis is crucial; the assessment of quality in competition cases would otherwise be at risk of subjective assessment by the reviewing authority. The application of subjective assessment of quality creates a significant risk of arbitrary decision-making and

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17 Article 101(3) Notice, at §57.
19 European Commission Decision of 13 May 2009, COMP/37.990 - *Intel*, available at http://ec.europa.eu/competition/antitrust/cases/dec_docs/37990/37990_3581_18.pdf. In the Hilti case quality concerns were raised with the European Commission to justify tying of Hilti’s own safe nails to its nail guns to avoid accidents but rejected on the basis that safety authorities could enforce the law to avoid marketing of any dangerous products by third parties.
must be avoided. Rather, economic and fact-based evidence should be designed to make predictable judgments about the impacts of quality.

26. While BIAC acknowledges that firms may compete on price and quality, it is in principle opposed to the use of quality considerations as a method to define markets more narrowly than would be the case under conventional, price-based methodologies. One main reason is that, as stated above, save in exceptional circumstances, one may assume that varying quality attributes are reflected in the prices of products. There are a multitude of economic methods available to measure the closeness of competition between the products potentially affected by a business transaction.

27. To the extent that regulatory agencies have sought to apply quality factors in competition cases, the outcomes have been patchy and inconsistent notwithstanding the existence in many jurisdictions of an efficiency defence that should (at least in theory) allow quality considerations to be factored in. This is not, by itself, surprising given the inherent difficulties in measuring quality accurately in most cases. A more complete approach to quality issues would seem to necessitate the development of empirical studies of the relevant markets but the time and resources required may not be available for such exercises.

28. Recognising this need for empirical evidence we attach a paper which describes "Experiences in the Telecommunications Industry". This is provided by way of illustration of the quality issues which can arise in the context of competition reviews. It is not suggested, of course, that there are particular lessons of general application which arise from the experience of this particular industry other than that each industry, and not just important industries such as Telecommunications, needs to be assessed in light of its own particular circumstances on a case-by-case basis.
The Role and Measurement of Quality in Competition Analysis: Experiences in the telecommunications industry

1. Introduction

Quality competition constitutes an important characteristic of many markets, in addition to price competition. A decrease in quality (with constant prices) can harm consumer welfare as much as an increase in price (with constant quality). However, it is not yet fully understood how to incorporate quality considerations into competition analysis. This draft paper provides examples for quality considerations in the application of competition law in the telecommunications sector through different authorities, namely DG Competition and both the German and French Competition Authorities. Furthermore, the paper makes some suggestions on how to change the approach of these authorities to better reflect the impact of quality parameters in the competition analysis.

2. Case law

- The traditional approach of the DG Competition has short to medium term price competition in focus, whereas quality aspects are more or less disregarded. This is reflected in recent EU decisions, particularly in the field of merger control in the telecommunications sector. So far, the EU COM does not comprehensively evaluate merger-induced quality improvements, such as better network coverage and better service-performance (like reduced interruptions, package loss, higher speed, and better service).

Merger Control

2012: Case no M.6497 - Hutchison 3G Austria / Orange Austria

- EU COM approved the proposed acquisition of Orange’s mobile telephony business in Austria by Hutchison 3 G. Since EU COM had concerns that the elimination of one out of four mobile network operators in Austria could have led to less competition and higher prices, the approval was tied to the implementation of remedies (divestment of radio spectrum, provision of wholesale access) that would facilitate the entry of a new player.
- A structural analysis was conducted by EU COM. The closeness of competition (diversion ratios) and price pressure indices (prediction of potential price increases resulting from the transaction) were investigated including a basic UPP test but the potential positive (dynamic) effects on quality were not evaluated. EU COM dismissed the parties’ arguments that the merger would strengthen the combined entity’s ability to roll out a more economically viable network by combining two weak networks.

2010: Case no. M.5650 - T-Mobile/ Orange

- EU COM approved the proposed merger of T-Mobile UK and Orange UK under the condition of an amendment of an existing network sharing agreement with Hutchison 3 UK and the divestment of a quarter of the combined spectrum in the 1800Mhz band.
- It was acknowledged by EU COM that the new entity would be able to offer next-generation mobile data services through LTE technology at the best possible speeds within the medium term but this performance outlook was rather seen as a threat to competition so that the new entity was ordered to divest a part of its spectrum.
Turning to a recent national merger decision of the German competition authority (Bundeskartellamt), it can be seen that there are first approaches to incorporate a merger’s effect on network quality in the decision:

**B7-70/2012: Kabel Deutschland/ Telecolumbus**

- The German competition authority did not approve the merger of two German cable companies due to the overall detrimental effect on competition.
- Nevertheless, the authority acknowledged that the merger would have had a positive effect on network quality. In geographic areas in which both companies have their own networks, the integration of their sub-networks would have been possible and likely. The combined network would then have had the critical size to allow for investment in broadband network expansion. Furthermore, narrowband sub-networks could have been improved by connecting them to other broadband-capable sub networks.

**Network Sharing Agreements**

With regard to network sharing agreements involving varying degrees of independence retained by the operators, the beneficial effects resulting from significant cost savings have gradually been acknowledged by EU COM. In 2003, EU COM set the standard of what was permitted under EU law.

**2003: Case COMP/38.369 - COMP/38.370**

- EU COM approved 3G network sharing agreements concerning site infrastructure between T-Mobile and MMo2 in the UK and Germany and gave a provisional exemption for national roaming arrangements.
- O2 appealed successfully before the European Court of First Instance striking down a part of the EU COM’s decision stating that national roaming arrangements in Germany had a negative effect on competition.

A more flexible approach was adopted in subsequent network sharing agreements which have not be challenged by EU COM or national competition authorities, e. g.:

- In 2007, T-Mobile UK and 3UK announced to pool their 3G network infrastructure in a 50:50 joint venture company, Mobile Broadband Network Ltd. In 2010, the integration of the 3G networks was completed.
- In 2009, Vodafone and Telefónica agreed to share networks and to work on joint builds of new sites in four European countries covering Britain, Germany, Ireland and Spain. The details of the deal were presented to the respective national authorities. In 2012, the UK telecoms regulator Ofcom approved Vodafone’s and Telefónica’s plans to strengthen their co-operation by pooling their respective mobile networks infrastructure to create one national grid.
- In 2011, T-Mobile and Orange Poland agreed to share access to each others networks via a 50:50 joint venture labelled “NetWorkS!”.

The French Competition Authority (FCA) on the other hand has issued a more sceptical opinion on network sharing and national roaming in 2013. While confirming the possible positive effects of network sharing, FCA has developed a three criteria test in order to examine such agreements on a case by case basis. The FCA supports network sharing only in sparsely populated areas. Concerning roaming, the FCA has proactively announced that it would be opposed to an extension of the roaming agreement between France Telecom and the new French low-cost mobile carrier Iliad ending in 2018.
3. Quality and competition

- In contrast to homogeneous electricity services quality competition is of particular importance for telecommunication services. Many different services based on different technologies with different quality are present in specific regions.

- Quality improvements in the telecommunication sector can mainly be achieved through network investments. The telecommunications industry is characterised by high long-term investment needs. Up to date, the explosion in the use of data-intensive mobile devices and the roll out of next generation technologies (fixed and mobile) constitutes the greatest challenge to telcom operators, especially in the light of strong competition in the European telecoms market.

- Analysts draw conclusions from the comparison of the respective price and quality level in the European and the US market: “Europe already has some of the cheapest telecoms services seen in the global developed peer group; the problem is rather that it is falling behind in terms of network capability. And having the cheapest telecoms service is not necessarily any more advantageous than having the cheapest health or education services. To put this another way, Europe is missing out on ‘dynamic efficiency’ gains. While Americans may pay more for their services, they have access to an increasingly superior platform. US prices might be higher, but this does not necessarily indicate that consumers there receive worse value for money - and meanwhile the American economy benefits from having a lead in terms of the other advantages a world-beating telecoms infrastructure can confer, with respect to productivity, innovation and so on.” (HSBC 2012, European Mobile, A proposal for progressive consolidation, p. 5)

4. Definition and Measurement of Quality

Definition

- **Quality of Service** (QoS) is a well established concept in telecoms markets. Various key performance indicators have already been defined and are generally accepted.

- The evaluation of QoS is relatively straightforward because it refers primarily to network quality which constitutes the most important factor of consumer preferences as the transmission and retrieval of information is the core telecommunications service.

- Nevertheless, there are many attributes of telecoms networks which have to be fulfilled in order to satisfy consumer expectations and cannot be offset against each other so there is a collection of characteristics which has to be met by a network operator.

- BEREC, the Body of European Regulators of Electronic Communications, has published guidelines for the quality of service in the context of net neutrality in November 2012. While the focus lies in the prevention of targeted traffic management (e.g. throttling), the publication sets out how BEREC understands and defines different concepts.
  
  o Following the ITU (International Telecommunication Union), QoS is defined as the “totality of characteristics of a telecommunications service that bear on its ability to satisfy stated and implied needs of the user of the service”.
  
  o **Quality of experience** (QoE) additionally takes into account user expectation and context, and is defined as the overall acceptability of an application or service, as perceived subjectively by the end-user.

- Overall, there are at least three dimensions to the definition of quality:
  
  o the availability, i.e. coverage of networks, and the take up of usage (penetration),
  
  o the technical parameters of the network (e.g. throughput, latency), and
  
  o the network performance as perceived by the end-users (e.g. interruptions).

- Most of these key performance indicators can be influenced by the telco operators themselves. Nevertheless, budget restraints and tough price competition limit the ability to choose the optimum quality level (at the given market price level).
The penetration rate is also influenced by external factors not imminent to the price and quality of telco offerings. For instance, country characteristics (GDP, urbanization etc.) and socio-economic conditions such as age, income, education etc are important.

For a detailed list of key performance indicators see Annex I.

Concrete examples of measurements

- EU Digital Agenda Scoreboard: It describes progress with respect to the targets set out in the Digital Agenda. In addition, it provides analysis and detailed data on all the policy areas covered by the Digital Agenda. EU COM commissioned a comprehensive survey covering all the 27 countries of the EU as well as Norway and Iceland and measuring the broadband coverage (by technology and combinations of technologies).
- OECD Broadband Portal: The portal provides access to a range of broadband related statistics gathered by the OECD. It identifies five main categories of broadband characteristics: Penetration, usage, coverage, prices, and service and speeds.
- Said Business School (Oxford) Broadband Quality Score: Broadband quality in 72 countries and 239 cities using data from the Internet speed testing side speedtest.net is assessed. It evaluates quality by combining scores for download and upload bandwidth as well as latency capabilities of a connection.
- Bundesnetzagentur, Germany: The German NRA commissioned a network quality study comparing advertised and actual data transmission rates of fixed broadband connections in Germany. From June to December 2012, internet users were invited to test their actual data transmission rates (achieved download speed) on the web site of the study in order to obtain an accurate picture of the overall German broadband market.
- "Connect" Mobile Network Test: Once a year, the German telecoms journal “Connect” conducts a study measuring the network quality in the German mobile telephony sector concerning voice and data of the four network operators as perceived by users.

5. Implications for Competition Policy

Since quality is an important parameter for the telecoms industry as well as for other industries and there are already established key performance indicators, a way for an adequate integration of quality indicators in the future competition law analysis has to be found:

Market Definition
Product Market
- It is evident that quality characteristics play a role in the context of market definitions. The grade of substitutability between different technologies (often quantified by price elasticities) derives fundamentally from similar quality characteristics.
- The evaluation of substitutability has to take place on the basis of the quality as perceived by the end-users, i.e. from a demand-side perspective. As stated in the note of EU COM on the definition of the relevant market (97/ C 372/ 03), all products and services are comprised “which are regarded as interchangeable or substitutable by the consumer […]”.
- With regard to internet access, households can choose between DSL, cable modem, fibre, WiFi and mobile. EU Com has traditionally defined mobile internet access to belong to a separate mobile market which may not necessarily reflect the relevance of mobile broadband services in many European countries. In particular, in Central and Eastern Europe fixed technologies tend to be less developed and therefore are often viewed as interchangeable with mobile broadband services. In those countries the question arises whether mobile and fixed technologies are directly substitutable.
  - Services based on different technologies are part of the same relevant market, even if the service quality is not considered as equal by all consumers. It is only important that the services are close substitutes for that many customers that the supplier is sufficiently disciplined (due to switching activities). That a minority of heavy internet users does not regard mobile broadband as a substitute is not relevant for the market definition.
It is sufficient that mobile broadband is a good substitute for basic fixed broadband products while it can probably not compete equally well with high-end broadband products. The quality characteristics have to be perceived as comparable from the point of view of the customers. Not only the technical parameters (e.g. bandwidth) of mobile and fixed broadband are decisive but primarily user experience and service performance as perceived by the customers (e.g. web browsing time taken to send and retrieve emails, and the capabilities to replay a YouTube video.)

Last but not least, the potential customer takes a combination of quality and prices into account when taking the final purchasing decision (so called quality-adjusted prices).

The example of mobile and fixed broadband shows how the evaluation of quality characteristics as perceived by the customers can contribute to the definition of the relevant product market.

Merger Control

- Quality issues have an even greater relevance in merger control as mergers can induce positive investment incentives and create synergies regarding the efficient usage of spectrum, network coverage and overall network performance.
- The flaw of the traditional approach to merger control lies in solely focussing on short-term price-side effects while the positive effect on quality gets completely neglected. The missing analysis of network synergies leads to an overestimation of the potential adverse effects on competition and to a too rigid restriction of mergers. Consumer satisfaction is likely to suffer since network quality constitutes an important part of consumer preferences and consumers highly value the long term evolution of the network infrastructure.
- What is needed is thus a more comprehensive review that weighs up investment-related synergies and upward price pressure. In other words, the effect of a merger on the price/quality ratio should be systematically evaluated at each individual transaction.
- Since 2004, the EU merger regulation states at least that efficiencies can be taken into account, if proven by the parties themselves: “In order to determine the impact of a concentration on competition in the common market, it is appropriate to take account of any substantiated and likely efficiencies put forward by the undertakings concerned.” (recital 29).
- Arguing with efficiency effects, the advantages of mergers in the telecoms industry can be described as follows:
  - Static efficiencies: The combination of two networks may lead to the establishment of a high quality one including a reduction in costs while improving the coverage.
  - Dynamic efficiencies: There are economies of scale concerning the required networks investments as these are lower than for the two pre-merger networks. A more concentrated industry is also likely to be capable to deliver higher investments.
  - In the mobile telephony market, the trade-off between a great number of competitors and the scarcity of frequencies (having an effect on quality and requiring an efficient usage) has to be considered.
- As the quality and the price level are equally important characteristics of competition, these factors should also be equally treated in competition policy. Consequently, they should, in principle, be evaluated simultaneously and with the same intensity. The current system, where price effects are comprehensively assessed while efficiency effects have to be proven by the parties themselves, is no longer acceptable.
### TELCOS MARKET

#### Availability of connectivity opportunities

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<td>BB Coverage (%) (fixed/ mobile)</td>
<td>% of population/households reached by wired (e.g. DSL, cable), wireless (e.g. Wifi, Wimax, Satellite) or mobile (e.g. UMTS) broadband access (by region).</td>
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<td>High-speed BB Coverage (%) (fixed/ mobile)</td>
<td>% of population/households reached by wired (e.g. xDSL, Docsis 3 cable, fiber) or mobile (e.g. HSDPA, LTE) high-speed broadband access (by region).</td>
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#### Take-up / usage (can only partly be seen as KPI as consumer behaviour is also influenced by external factors.)

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<tbody>
<tr>
<td>BB Penetration (%) (fixed/ mobile)</td>
<td>% of population/households actively using the wired (e.g. DSL, cable), wireless (e.g. Wifi, Wimax, Satellite) or mobile (e.g. UMTS) broadband access (by region).</td>
</tr>
<tr>
<td>High-speed BB Penetration (%) (fixed/ mobile)</td>
<td>% of population/households actively using the wired (e.g. xDSL, Docsis 3 cable, fiber) or mobile (e.g. HSDPA, LTE) high-speed broadband access (by region).</td>
</tr>
</tbody>
</table>

#### Price level

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price (in EUR)</td>
<td>Price for a specific quantity of minutes or quantity of data at a specific speed per user per specific time period based on available offers and consumer profiles (quality-adjusted).</td>
</tr>
</tbody>
</table>

### TECHNICAL PARAMETERS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertised Download Speed (Mbps)</td>
<td>Maximum amount of download data than can pass through the line per second (capacity of bandwidth).</td>
</tr>
<tr>
<td>Advertised Upload Speed (Mbps)</td>
<td>Maximum amount of upload data that can pass through the line per second (capacity of bandwidth).</td>
</tr>
<tr>
<td>Achieved Download Speed (Mbps)</td>
<td>Actual download throughput, e. g. the average rate of successful data transmission.</td>
</tr>
<tr>
<td>Achieved Upload Speed (Mbps)</td>
<td>Actual upload throughput, e. g. the average rate of successful data transmission.</td>
</tr>
<tr>
<td>Latency</td>
<td>Round trip time: a signal’s travel and processing time.</td>
</tr>
</tbody>
</table>
# Annex I – Key Performance Indicators

## EXPERIENCED PERFORMANCE

### Performance Level Voice - fixed or mobile

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Set-up Success Rate (%)</td>
<td>Fraction of attempts to make a call that results in a connection.</td>
</tr>
<tr>
<td>Call Set-up Time (s.)</td>
<td>The overall length of time to establish a call between users (summation of call request time, call selection time and post-selection time).</td>
</tr>
<tr>
<td>Voice Quality Standards</td>
<td></td>
</tr>
<tr>
<td>Mean Opinion Score: derived by having people rate the quality of test sequences.</td>
<td></td>
</tr>
<tr>
<td>Perceptual Evaluation of Speech Quality: automated assessment of the speech quality as experienced by the user.</td>
<td></td>
</tr>
<tr>
<td>Perceptual Objective Listening Quality Analysis: advanced level of benchmarking accuracy suited for next generation networks.</td>
<td></td>
</tr>
</tbody>
</table>

### Performance Level Internet (Web page) – fixed or mobile

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
</table>
| Service Accessibility (s.)          | Start: First [SYN] sent.  
Stop: Reception of the first data package containing content.                                                                         |
| Session Completion Ratio (s.)       | Start: First [SYN] sent.  
Stop: Reception of the last data package containing content.                                                                           |
| Session Time (s.)                   | Start: Pressing button to request a certain web page.  
Stop: Reception of the last data package containing content.                                                                            |

### Performance Level Internet (Email retrieve) – fixed or mobile

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
</table>
| Service Accessibility (s.)          | Start: Socket connect.  
Stop: List Inbox.                                                                                                                                |
| Session Time (s.)                   | Start: List inbox.  
Stop: Reception of last header data packet.                                                                                                 |
| Attachment Session Time (s.)        | Start: Button press to load email (fetch).  
Stop: Reception of last data package.                                                                                                           |

### Performance Level Internet (Streaming, e. g. YouTube) – fixed or mobile

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
</table>
| Service Accessibility (s.)          | Start: First [SYN] sent.  
Stop: YouTube Playback Start.                                                                                                                  |
| Session Completion Ratio (s.)       | Start: First [SYN] sent.  
Stop: Reception of the last data package containing content.                                                                                   |
| Session time (s.)                   | Start: First [SYN] sent.  
Stop: YouTube Playback End.                                                                                                                    |
| Interruptions (%)                   | Portion of play-outs that could be finished without any interruptions.                                                                         |

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This paper has been prepared on the basis of the following sources:

### Literature


**International Telecommunication Union** (2012): Overview of Quality of Service:


Annex I – Key Performance Indicators


Concrete Examples of Measurement

**Bundesnetzagentur**

**Connect: Netztest 2012**

**EU Digital Score Board**

**OECD Broadband Portal**

**Saiid Business School**

Decisions

**EU COM**
M.6497 Hutchison 3G Austria/ Orange Austria

M.5650 T-Mobile/ Orange

COMP.38369 O2/ T-Mobile/ Viag Interkom

COMP.38370 Network Sharing UK
http://ec.europa.eu/competition/elojade/isef/index.cfm?fuseaction=dsp_result&policy_area_id=1,2,3&case_number=38370.

**Bundeskartellamt**
B7-70 Kabel Deutschland/ Telecolumbus

**French Competition Authority**
Mobile Telephony: network sharing and roaming
http://www.autoritedelaconcurrence.fr/user/standard.php?id_rub=483&id_article=2062