Hybrid & AI

NEW GENERATIONS OF MEASUREMENT AND THE CHALLENGES OF MEDIA MEASUREMENT

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Mediametrie
High trust data

Foreword

The media ecosystem is currently undergoing a profound transformation driven by the increasing delinearization and fragmentation of consumption patterns. This underlying trend translates into new needs for all market players, and audience measurement must transform to meet them.

The data sources useful for measurement are multiplying: return-path data - “data” - now cover a large portion of consumption and are becoming an interesting complement to individual audience data from panels. They provide a robust source for quantifying audiences for a larger number of content. Data provide a greater precision and granularity to measurement. But these «data» also carry myths that sometimes suggest we could do without panels and surveys. The reality, which we will attempt to clarify, is that it is precisely the combination of these data sources that enables the transformation of audience measurement systems.

The subject is not new, and the evolution towards hybrid systems is already underway in many countries. This white paper aims to analyze these evolutions from a historical and theoretical perspective, but also through concrete implementation examples, and to explore the prospects opened up by recent developments in AI. To complement this reading, several industry experts have agreed to share their views on the subject and its challenges.

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Prefaces

Between fragmented uses and algorithmic power: measurement in a state of flux

The transformation of audience measurement systems today is being driven by two major dynamics: the hybridization of data sources and the integration of artificial intelligence. These changes are not simply technical; they are redefining the very foundations of measurement, its legitimacy, its governance and its ability to support changes in media usage.

Firstly, hybridization meets the need for representativeness and granularity. Panels, the historical basis of measurement, offer methodological rigour and valuable stability. But they struggle to capture the infinite diversity of fragmented, multi-screen, multi-context digital behaviour. The contribution of massive data – logs, impressions, browsing – makes it possible to broaden the spectrum, detect weak signals and better understand customer journeys. However, this hybridization needs to be based on clear principles: complementary sources, transparent models and auditable results.

That's where AI comes in. It enables modelling, adjustment and prediction. It can enrich data, detect anomalies and optimise processing. But it also raises major ethical questions: how can we guarantee the absence of bias? How can we explain algorithmic decisions? How can we ensure that players have sovereignty over their data? AI must not be a black box, but a lever for confidence and progress.

"AI must not be a black box, but a lever for confidence and progress"

In this context, measurement is more than ever a strategic issue for brands and the media. It can no longer be thought of as a fixed tool, but as a living, evolving, co-constructed system. Cross media measurement, which we are all working on together, embodies this requirement. It aims to provide a de-duplicated view of campaign exposure across all channels – today TV, digital, CTV, video platforms and tomorrow other media. For brands, the aim is to better manage advertising pressure, avoid overexposure and improve the effectiveness of their campaigns.

Internationally, the pilots of the WFA (World Federation of Advertisers) initiative, such as Origin (UK) and Aquila (USA), are supported by advertisers. They inspire the French developments carried out by Médiamétrie with the support of the Union des Marques (French Advertisers' Association). Tests on TV+CTV campaigns combining watermarking, adserver logs and modelling have already identified significant performance gains. These results confirm that the hybridization of approaches, supported by AI, makes it possible to better reflect the reality of usage and optimise media strategies.

By enriching models and optimising processing, artificial intelligence can speed up this transformation, provided it remains transparent and responsible. It must serve comparability, collective performance and the sovereignty of the players involved.

Cross-media measurement, enhanced by AI, is more than ever an opportunity for brands to build fairer, more inclusive and more effective systems. But it is also a collective responsibility: to ensure that technology remains at the service of transparency, comparability and trust.

Jean-Luc Chetrit
WFA Treasurer and CEO of Union des Marques

Prefaces

Why the future of audience measurement must remain hybrid

It would be an understatement to say that French media consumption has become fragmented over the last few decades. Before the launch of DTT, the French had a choice of six television channels. Today, more than 1,000 channels are available. The audio offering has also been greatly enhanced. Added to this profusion of supply is the multiplication of modes of consumption in a world of hyperdistribution, where content is available through multiple offers and channels, in particular via OTT platforms and social networks, which are particularly important for young people. In this context, audience measurement is struggling to keep up with usage and a panel, even of significant size, can no longer account for the full diversity of these behaviors.

The limits of expanding the sample size are the increasing difficulty of reaching people, particularly younger people, and the additional costs involved. The good news for measurement specialists is that all our digital actions leave traces, offering a vast amount of data (connections, browsing, streams, etc.) and new opportunities for hybrid measurements.

For CESP, the trusted third party in charge of auditing audience research, these hybrid measures require us to ensure the quality and therefore the reliability of the results obtained, on several levels. First of all, the quality of the source data is essential (“garbage in, garbage out”!). This covers both panels and surveys, as well as so-called passive data (server-side logs, device-logs, etc.), with two dimensions: certification of data volumes and data quality. Then there is the question of how to bring these sources together, with the many possible hybridization techniques clearly set out in this white paper. All audience measurements now include at least one model, or even multiple models that are linked together, which raises two major questions. Firstly, what is the source of truth that validates the quality of the model? Secondly, how robust and accurate is the output data? We note that calibration is often carried out at a macro level, but with the aim of producing micro results, i.e. at target level, in response to user expectations. This calls for great caution in how these results are used operationally.

In the future, can we imagine a world of measurement based solely on passive data, with generative AI adding to and augmenting it? I don’t believe so.

Current developments reinforce three advantages of a centrally controlled and managed panel. Firstly, to avoid the phenomenon of bots which, enhanced by AI, will be able to generate increasingly sophisticated invalid traffic in digital signals. Secondly, with an increasingly restricted regulatory framework requiring ever more explicit consent, a panel based on the informed consent of participants is more resilient. Finally, a panel managed and financed on a multi-party basis avoids self-measurement phenomena and enables the market to share the same currency for the benefit of advertisers.

The last 10 years spent at CESP – during which we have audited every year all the audience measurements for the French market, but also for other countries in Europe, Asia, Africa and the Middle East – have convinced me that no

“The future of audience measurement will necessarily be hybrid”

methodology is perfect. Surveys or passive data, each has its advantages and disadvantages, and single-source panels, the potential “holy grail”, are themselves limited by their cost and their acceptability to panellists who do not necessarily want to be tracked in all their media use.

I am therefore convinced that the future of audience measurement will necessarily be hybrid and that panels and surveys will continue to play a central role in calibrating models and labelling data reliably in order to fuel the hybridizations of tomorrow

Valérie Morrisson
Managing Director of CESP

Introduction

A brief history of **media audience measurement**

Measuring media audiences is a practice as old as the media themselves. It stems from the fundamental need to know your audience: who is watching, who is listening, who is reading?

For the Print media, circulation data for titles was an essential piece of information that gave newspapers an idea of the public's appetite. This information does not constitute an audience, since a single copy distributed may be seen by several people. But it provides information on the public's tastes (and their ability to buy an issue, subscribe, etc.). Before real audience measurement for the press was launched, this data was often supplemented by readers' letters, which provided a qualitative perspective. Touch on a section that the public love and they'll let the editorial team know about it in copious letters.

For the audiovisual media, the situation was more complex, since besides data from listener/viewer letters, terrestrial broadcasting made it impossible to produce distribution data similar to that for the press: we know the number of physical transmitters, but no information is available on the receivers (the public). This is what encouraged the rapid development of the first audience measurements for radio and television media, soon after they were developed for the general public.

This knowledge of the audience, which is essential for publishers and advertisers alike, has always been at the heart of the development of editorial content and advertising space. However, tools and methods have changed radically over the decades, as uses and technologies have evolved.

First steps: the era of declarative methods and telephone surveys

The first audience measurements date back to the 1930s, in the days of radio. In the United States, pioneering institutes such as Hooper and Crossley used telephone surveys to estimate programme audience figures. A few years later, in 1949, Nielsen acquired the right to the Audimeter, a new technology attached to a radio transmitter that allowed to capture what people listened to.

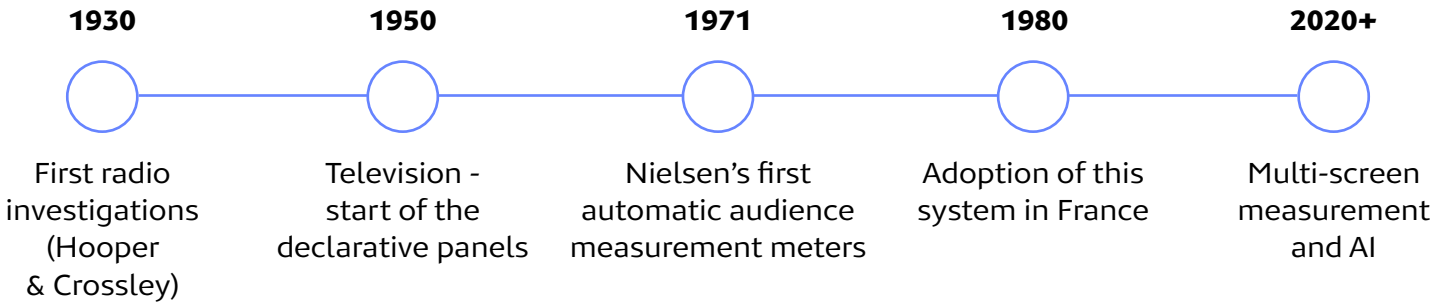
With the arrival of television in homes in the 1950s, the need for more accurate and continuous measurement became apparent. In France, the first measurements were still based on a declarative methodology similar to that used for radio. But in the late 60s automatic measurement systems were developed (in the shape of a box installed in the homes, connected to the television set). In 1971, Nielsen introduced the Storage Instantaneous Audimeter, capable of storing TV set usage data and forwarding data overnight via phone line.

The system was adopted in France in the early 1980s. Measurement technologies have subsequently evolved, adapting to changes in the way audiovisual media are broadcast and distributed, so that audiences can be measured in all possible configurations (all locations, all screens, all timeframes). The new measurement technologies now include software meter installed on digital devices (Realitymine, Ipsos Mediacell, Gemius ...) or portable individual device in the shape of smartband / watch (Médiamétrie RateOnAir, Nielsen PPM, Gfk Mediawatch).

Samples and panels at the heart of measurement

All these measurements were based on sample and panel data, which became the standard for audience measurement. This was due as much to the practical constraint of not being able to interview everyone as to the need to base the measurement on individual data representing people's media use and consumption.

The promise was strong: a small number of households are carefully selected to represent the behaviour of millions of people. This approach, based on sample survey theory, combines scientific rigour, methodological transparency and shared governance. It enables the production of studies that become real currencies and a common language for the media market.



The age of data: **a digital revolution**

"The Holy Grail of measurement combining representativeness and infinite granularity"

With the rise of widespread use of the Internet, digital technology and connected devices in the 2000s, a new horizon opened up: that of massive new data recording all digital consumption actions. This brings us to the Holy Grail of measurement: combining representativeness and infinite granularity. The development of the web was accompanied by analytic measurements that counted every click by Internet users. This measurement continued to develop and contributed to the advertising success of digital media by enabling massive data collection.

All this new return path data and the measurement tools that processed it became the benchmark in the digital ecosystem. In particular, the digital advertising market largely adopted the concept of advertising impressions. A measure of advertising pressure. A concept of pressure similar to that of GRPs (the number of target contacts). There is one major difference between the two. GRPs are in fact calculated on the target audience and therefore requires knowing who has seen the advertisement.

The development of this data economy has been spectacular, enabling a few players with unique ecosystems and services (search, social networks, etc.) to develop a powerful advertising model

The promises and benefits of data compared with samples

The arrival of digital technology has turned the media economy on its head. With it, a new resource has become central: data, behavioural data collected on a massive scale. Unlike traditional methods based on panels or surveys, in theory data made it possible to capture every action: a page viewed, a click, a video started, a piece of content shared. A radical new era was emerging: the end of survey measurement in favour of exhaustive, real-time, granular measurement.

The production of audience ratings based on samples was subject to a number of well-known constraints. Data promised to free us from these constraints:

- Samples are subject to selection bias:
With the exception of Public Statistics, which has a sampling frame covering the entire population, samples are never drawn completely at random. The quota method, which consists of aligning the structure of panels and samples with that of the population, is based on the assumption that the fact of responding to the survey depends on socio-demographic characteristics and not on audience behaviour. But this hypothesis can never be fully verified.

- Samples are subject to precision limits:
The principle of a survey is to estimate information about a population by questioning only part of it, the challenge being to select a representative sample of the population. The ratio between the size of the population and the size of the sample measures the number of people that each interviewee/panellist represents. For television measurement, a panellist represents an average of around 6,000 French people.

“Faced with the known and documented limitations of samples, data opens up a new field of exploration and new potential for media audience measurement”

This makes it easy to understand the limitations of samples for measuring very fragmented usage

- Results produced from samples are subject to sampling error:
Sampling error is due to the variability inherent in the sample selection process. Two samples of the same size selected using strictly the same protocol will give different results. This variability is scientifically documented and quantified by indicators such as the confidence interval

The companies that carry out the surveys and recruit the panels use rigorous methods to limit the impact of these constraints, under the control of the third parties who audit them. In France, these external audits are carried out by CESP.

A very detailed report for each media analyses the methodological characteristics of the study and the quality of its execution.

Faced with the known and documented limitations of samples, data opens up a new field of exploration and new potential for media audience measurement.

Myths and realities of a measurement world where data replaces surveys and panels

Faced with these tantalising prospects, provocative speeches flourished: “the panel is dead”, “data will reveal everything”, “no more need for samples, we have everything”. In the industry, some advertisers and agencies saw data as an opportunity to regain control of the media value chain. As far as the platforms were concerned, control of this data was becoming a lever of power: whoever owns the data owns the measurement, and therefore the value. Finally, for some publishers, comprehensiveness meant additional audiences, as well as a reduction in volatility.

But this promise also came up against a more complex reality. Three myths illustrate the complexity of this new reality in the world of data.

Myth 1: “Data is exhaustive and offers a complete overview.”

Data is collected at many different levels: from set-top boxes, apps, connected TV sets, mobile terminals and platforms, etc. Each set of data collected on one of these segments provides an exhaustive view of this universe. Platform A has access to a very large volume of data on its users, but knows nothing about the usage of users when they are on platform B. The data is very rich, but it only reflects the segment of the population it is analysing. This limitation is important if we want to use these data to obtain a representation of the uses of the population as a whole.

In addition, beyond this topic of covering all uses, as data is proprietary, it is often produced according to specific calculation rules and standards. Those who own it often impose their own metrics, their own standards, their own models. The lack of standardisation makes it difficult to compare different data.

Understanding this limitation, the institutions of the European Union have recently taken a clear position within the framework of the European Regulation on Freedom of the Media. Article 24 of this regulation therefore promotes the application of market audience measurement principles, explicitly including the principle of comparability. In addition to these principles, there is a strict framework, in terms of protection of the personal data of digital service users, which has a significant impact on what analytics tools can produce. GDPR in particular, but also the ePrivacy Directive, establish the principle of processing analytics data on the basis of user consent for audience measurement purposes. However, there are exceptions in some EU countries. This is particularly the case in France, where the CNIL (CNIL stands for Commission Nationale de l’Informatique et des Libertés. It is the national authority responsible for data protection and privacy) has published Guidelines and a Recommendation allowing data, in some specific cases, to be collected under an exemption from consent. The processing of the data collected is then strictly controlled, allowing simple counting of interesting volume elements but limiting the depth of the information.

In the United States, as part of its work to switch to its new TV+Big Data system, Nielsen was asked to compare Smart TV data with their panel data. The comparison was made at the level of each device measured by the two systems. The Smart TV data was found to have a narrower scope in terms of channels and programmes than the Nielsen data.

This is because data from Smart TVs is generally collected using video or audio fingerprinting technology. Software embedded in the television's operating system identifies the content and channels being broadcast (once the user's consent has been obtained). The problem is that this system relies on the ability of these players to create a library of content and channels. These libraries are large, but cannot be exhaustive, either for practical reasons, or sometimes for contractual reasons.

Alternatively, data from TV sets can be collected via set-top boxes. In this case, the collection of data (always subject to prior consent) will be more exhaustive. However, its scope is also limited to TV/Video services directly controlled by this operator. In reality, this data only captures a fraction of users' TV/Video usage.

Myth 2: "Data is accurate and infallible."

On a theoretical level, beyond the limits of what data cannot measure, it is exhaustive. They are therefore not subject to sampling error. However, the operational implementation of these measurements can lead to errors of various kinds:

- The technical limitations inherent in measurement:
Some users of analytics tools exploit indicators without knowing their limits. Analytics tools do not measure individuals. They measure at best a number of terminals, or more often a number of browsers or cookies. This data is therefore a false overall estimate of the number of people who visit a site for several reasons:

Fragmentation of uses on several terminals: Users have several terminals. However, each terminal is often identified differently by measurements that do not link them well.

Delete cookies and surf anonymously: Most terminals allow you to simply delete cookies or to surf using a mode that limits the personal and browsing data transmitted to sites.

Terminal sharing: Some screens are shared by several users, making it difficult to identify individuals.

- Errors linked to the settings:
The Internet is an interconnected network on which people are not the only ones "browsing". The bots and computer programmes used by digital players scan the content of pages to reference, analyse and understand them... A colossal amount of traffic that can distort analytic measurements if they are not correctly configured. The IAB/ABC publishes a list of bots and spiders to be excluded from measurements. This list is constantly updated. The main tools therefore exclude this traffic. But there is always the possibility that one of these bots created is undeclared and generates artificial traffic (even if other methods exist to identify them)

- Fraud:
Fraud is an important issue that can enable malicious third parties to generate advertising revenue by simulating artificial traffic. For example, the hackers behind Hyphbot in 2017 created a system that generated fake Premium sites identified as such by advertising networks. These fake sites were then fed by bot traffic that generated millions of fictitious impressions. The fraud was detected by a fraud detection tool (AdForm). Many players are now offering their services to detect and stop these attempts.

Myth 3: “Data will replace panels.”

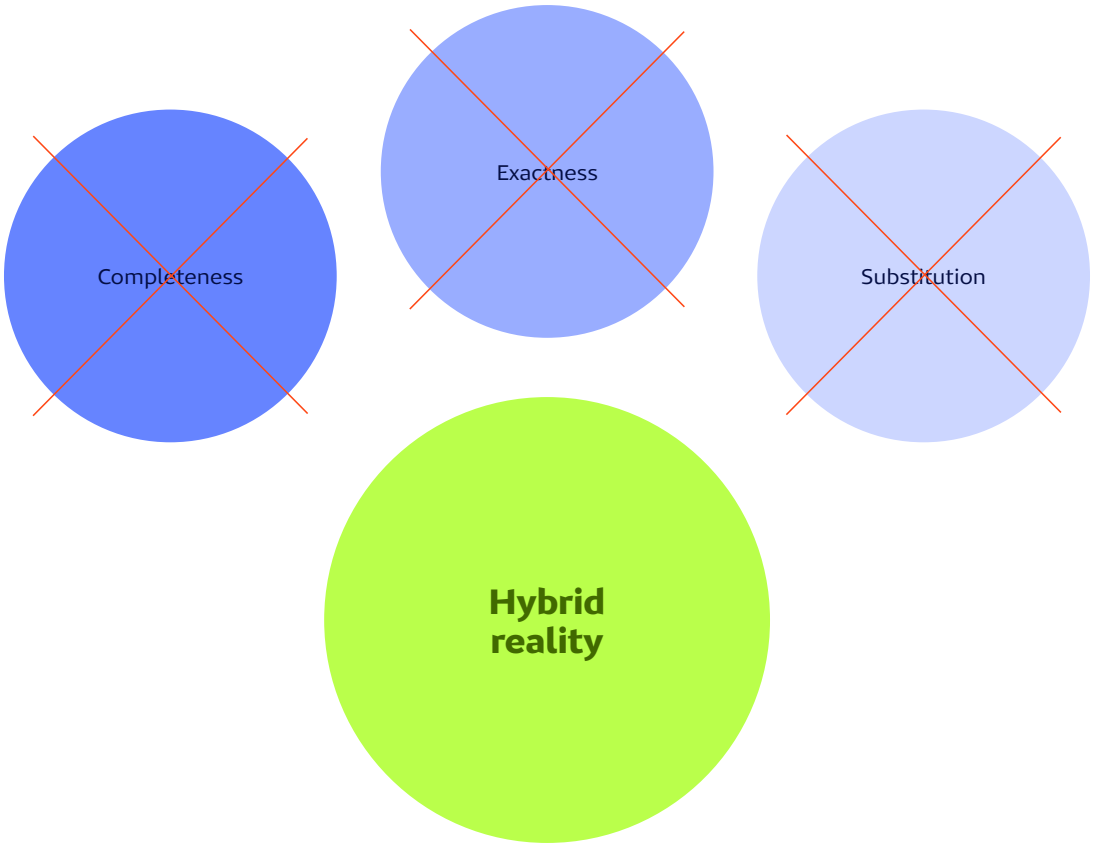
This myth, which combines two others, is based on the idea that massive data is sufficient to accurately describe behaviour. However, a set of data, even an exhaustive one, is only of value if it covers a relevant universe and makes it possible to calculate indicators that are intelligible to the market. Audience measurement provides a response to several key dimensions that are not natively covered by return channel data:

- Individual:
By tracking the audience of individuals, not machines.

- Transversal:
By making it possible to deduplicate the activity of individuals whose data is potentially locked away in separate silos (data from two different platforms, for example).

- Longitudinal:
By tracking the behaviour of the same individuals over time.

Data, on the other hand, is infinitely rich, but lacks the qualities that are essential for producing audience measurement. So one cannot replace the other. These are two different tools that follow distinct approaches, and together they can enrich our understanding of usage.



The first forms of **data regulation**

All of these factors, which limit or disrupt measurement, have led to the emergence over the years of:

- Standards, particularly in the advertising field, such as those of the IAB (Internet Advertising Bureau) and the MRC (Media Ratings Council). The IAB has published a number of reports and guidelines, including the Interactive Audience Measurement and Advertising Campaign Reporting and Audit Guidelines, and the Digital Video Ad Impression Measurement Guidelines.

- Audits & certifications of editorial analytics data (such as those carried out by the ACPM in France, or the ABCs worldwide). In the United States, the Media Ratings Council offers its services to audit measurement solutions (panels and analytics). In France, alongside its regular studies of official media audience measurements, the CESP (Center for the Study of Advertising Media) also carries out specific audits, such as its review of viewability measurement tools.

- Players specialising in fraud analysis (Human, Integral Ad Science, AdLoox, DoubleVerify, etc.) who offer their services to provide advanced analysis, including fraud detection, in advertising metrics.

Leaving aside the controls carried out by actors such as the ACPM or the ABC, most of these control tools remain optional and their use depends on actors' choices.

The need for a **synthesis of approaches**

The media world is becoming increasingly complex. Its uses are segmented and fragmented. In France, the launch of DTT in 2005 has been as much a driver for the development of media usage, by expanding the offering, as it has reconfigured an audiovisual landscape that was based on a handful of channels. In the digital world, these fragmentation effects have accelerated even further. While fewer than a dozen digital brands have more than 10 million users every day, almost 900 are visited by more than a million people every month. In the world of audio, the emergence of podcasts has led to an explosion in the range available at any given time and is therefore contributing to the fragmentation of usage. By way of illustration, on a platform like Spotify, over six million podcasts are available (source Spotify – December 2024). Arcom, for its part, identifies that in France, more than 10 million episodes of podcasts are available. These figures attest to the profound changes in the landscape and its uses that are potentially opened up by this new offering.

Faced with this reality, the limits of the samples described above make themselves felt when it comes to capturing a certain granularity of usage. This is why some measurements have adapted the size of the samples used. This was particularly the case for television measurement, where the sample size has increased significantly over the years (In France the sample size grew from 2,300 households in 1999 to 5,500 households and an additional panel of 5,500 individuals in 2025) to keep pace with these changes. We see similar changes in most countries.

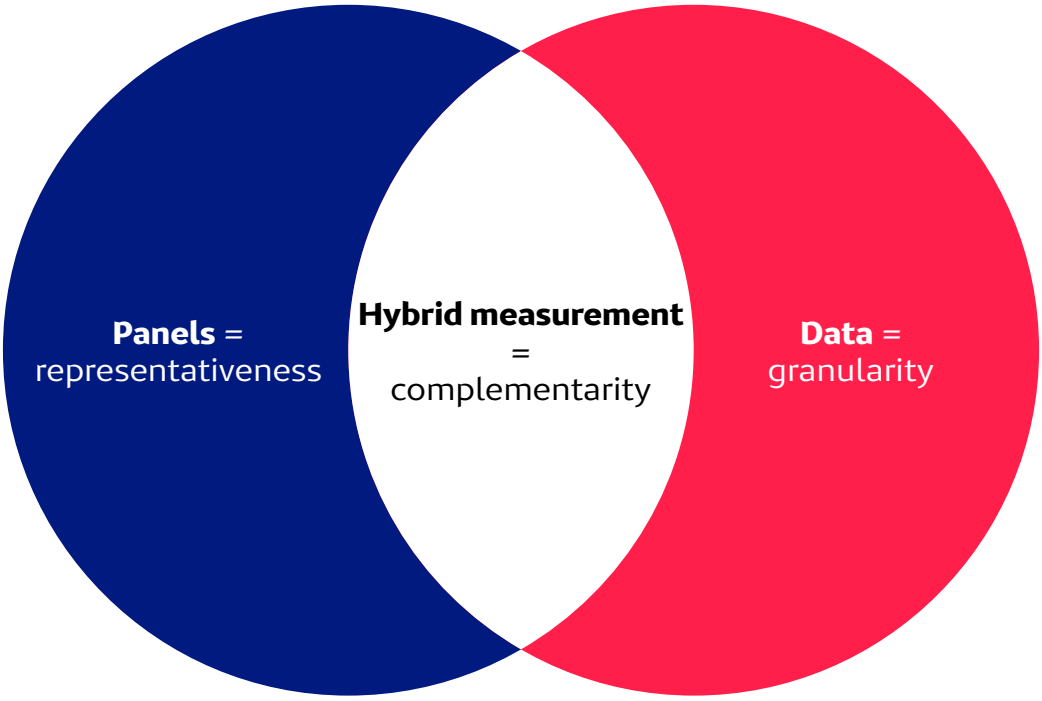
Since the late 90s and early 2000s, digital technology and the fragmentation that goes with it have seen the development of analytical tools that take advantage of return path data. This new data then evolves in silos, with users only having access to their own data. This data nevertheless offers a level of precision hitherto unknown in terms of usage. At the same time, measurements based on panels are being developed (JupiterMMXI, NetRatings, Netvalue, etc.). Comparisons between the data generated by these two tools are becoming increasingly common, and this has led to a great deal of debate, as analytics generally measure two to three times as many users as panel-based measurements. The difference is explained in particular by the deletion of cookies, which overestimates the number of visitors (since after each deletion of cookies, the system considers that it is in the presence of a new user).

The development of data-based measurements and their comparison with panel-based measurements is also rapidly becoming an issue for television. Operators have real-time access to the number of boxes connected to a channel at any given time, enabling the development of alternatives to panel measurement.

TV measurements based on data from triple-play boxes

So when French telecom operators rolled out triple-play boxes in the early 2000s, observers were predicting the end of television audience measurement as we knew it. Data from set-top boxes would be the new benchmark. For a number of years, Médiamétrie developed a television measurement system based on return channel data (Digitime). But the more complex operational reality showed that these new data, while providing additional richness, and in particular the possibility of analysing scores in real time, could not replace those of the Médiamat. Audience measurement reflects the individual behaviour of the public. And not just whether set-top boxes are connected to a channel. Is the screen actually on? Who's in front of the screen? How can we make the link between an individual's use of different boxes (TV at home, watching a match in a bar, or replaying programmes on their mobile phone)? In addition, while these new figures reflect the habits of a growing number of users, in many countries analogue reception without a return path is still important (in France, in 2025, a third of the population accesses television by terrestrial reception on a television set). For 13% of them, this is the exclusive mode of reception. However, the consumption profile of these users is very different from that of «connected» users. These are all central questions that cannot be answered by box data alone, and which are answered by historical panel measurements.

This example clearly illustrates the need to build measurements that take advantage of panels and return path data.



Reconciling data and samples: hybrid approaches

Reconciling data and samples : **hybrid approaches**

Behind the apparent opposition between measurements centred on individuals and those derived from data, the fact is that neither panels nor data alone are sufficient to accurately describe the reality of future habits. Panel data is relevant in a less fragmented world. The emergence of platforms and on-demand consumption has led to an explosion in the fragmentation of uses, requiring new approaches. At the same time, the limits of data, particularly within a European framework that is highly protective of users' personal data, are clear. The solution is to combine the data. Combining panels and data to create a new, more granular and accurate measurement.

This marks the beginning of the era of **hybrid** measurements.

An ancient principle

Hybridization means combining several data sources of different origins to create a new, richer or more accurate data.

The concept of hybridization is not new. The use of auxiliary information is classic in sample survey theory: the adjustment of a sample on data from the population census is a perfect illustration. There are many examples of the hybridization of different data sources in the media world.

What's new is the emergence of a new generation of hybrid measurement that combines individual data, «people data», with return path data, «device / app data». A generation of measurement that promises to overcome the shortcomings of both panel and survey data and exhaustive data.

Implementing these new measurements requires new tools, new skills and often complex statistical models.

A story of the search for balance and reinventions

The history of audience measurement is a history of constant balancing: between representativeness and exhaustiveness, between transparency and data ownership, between collective standards and specific needs. But it's also a story of constant innovation, where every technological revolution calls for methodological reinvention.

"Every technological revolution calls for methodological reinvention"

Today, with the fragmentation of uses, the development of platforms and the proliferation of data, audience measurement is more than ever a strategic challenge. It is in this continuity that the need for a hybrid, open, governed and intelligible measurement, at the service of the entire media ecosystem, arises.

The benefits of **hybrid measurement**

Hybrid approaches have many advantages that go far beyond simply increasing the accuracy of results.

Digital media are characterised by increasingly fragmented consumption: between screens, platforms, formats and times of consumption, it is increasingly difficult to measure all aspects of a media with a single device.

It is in this context that **hybrid measurement** is emerging, not as a single method, but as a **family of approaches** aimed at reconciling heterogeneous data sources to reconstruct a more accurate picture of media behaviour.

Hybrid measurement allows you to take advantage of the **complementary strengths** of different systems: panels, surveys, digital data, CRM, logs, technical metadata, etc. It is also important to understand the nature of this data in order to determine the most appropriate association model, depending on the need.

There are four main benefits from these measurements:

- A response to increase the acuity of measurements on the smallest audiences:
The development of on-demand consumption is encouraging audience fragmentation. In addition to a handful of programmes that continue to attract massive audiences, on-demand platforms are encouraging the development of increasingly fragmented usage. Panels can continue to accurately measure the largest audiences, even on demand, but measuring other content is becoming a real challenge.

- Extending coverage of uses:
Audience measurements are subject to a set of implementation constraints. Each method of gathering information has its advantages and limitations. These limits include restrictions on the scope of the audience measured. The use of data can extend the measurement range of a panel measurement system.

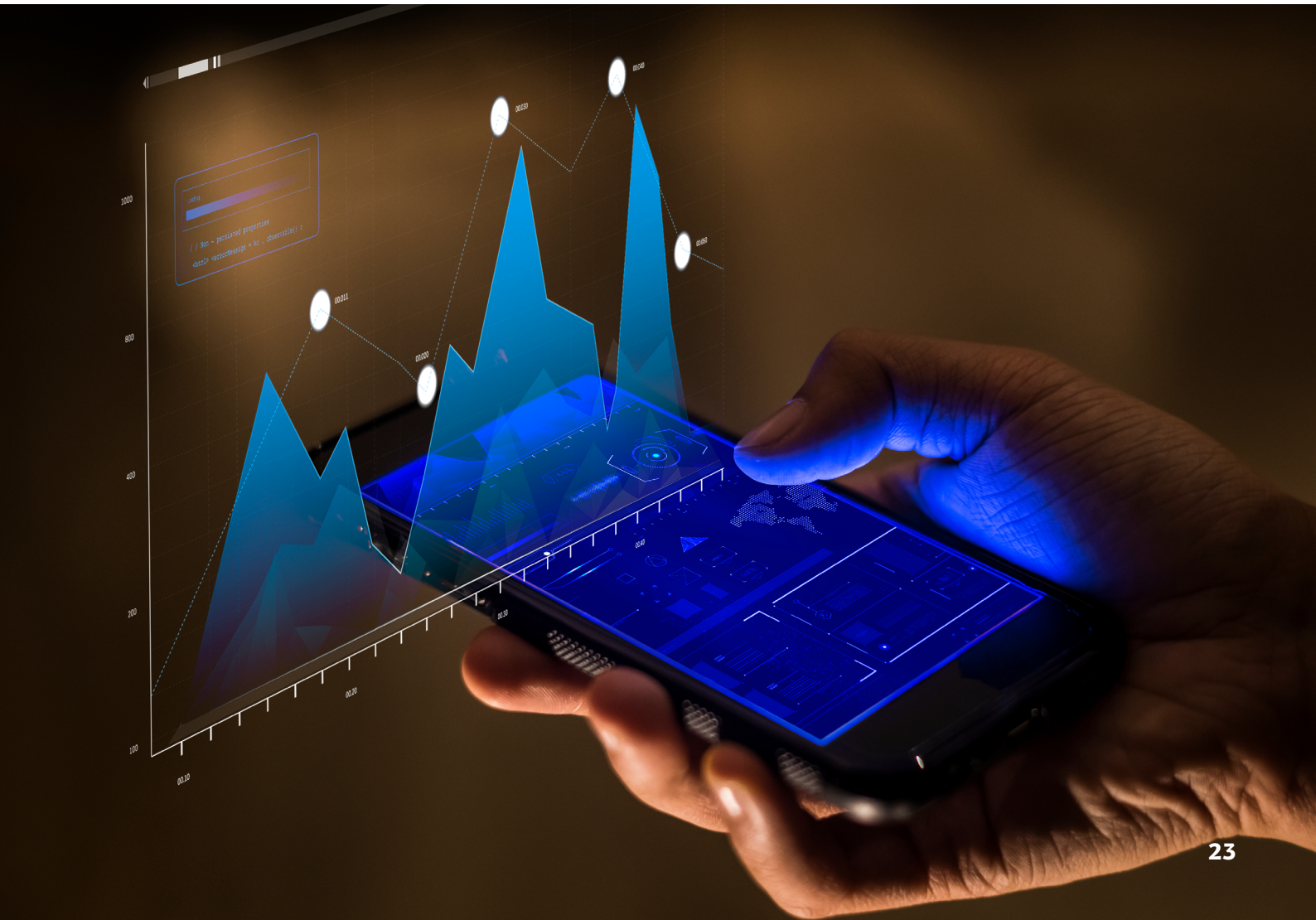
- Models for dealing with panel selection bias:
As we noted earlier, panels are potentially subject to selection bias. The use of exhaustive exogenous data can correct these biases by calibrating on usage levels in addition to the traditional calibration of socio-demographic structures

- Optimising the cost of a measurement method:
The use of hybrid systems means that the cost of measurements can be optimised. Without such systems, increasing the accuracy of measurements simply by increasing the number of interviews or panellists would be much more expensive.

But optimising costs does not mean, for example, that it will be possible to reduce the price of an existing measurement by replacing part of the sample with data. There are several reasons for this. First of all, return path data is not free. The owners of this data, unless they are obliged by regulation to provide it free of charge (which was the case in Canada, for example, following a decision by the CRTC - Canadian Radio-television and Telecommunications Commission), set a cost for access to the data. This can be significant. Moreover, hybrid systems by definition operate on two pillars, one based on panel or survey data and the other on return path data. To be relevant, statistical models require reliable and substantial training datasets.

"To be relevant, statistical models require reliable and substantial training datasets"

In most cases, therefore, it is not a question of reducing existing costs, but of extending the precision and coverage of a measure at a much lower cost than would have been necessary with a traditional approach. The laws of statistics teach us that to double precision, you need to quadruple the size of samples and panels. In practice, this would result in a very significant increase in the cost of this measurement method. Conversely, with a hybrid approach, we can envisage an improvement in accuracy (even well beyond a doubling), at a lower additional cost.



Hybrid measurement principles and typology

The main principles of hybrid measurement

The hybrid measurement approach is based on four fundamental principles:

- Complementarity:
No single source is sufficient on its own. The idea is to fill the gaps in one source with the qualities of another

- Temporal and structural alignment:
To combine data, they need to be aligned in time (for example, over the same period) and in their definitions (comparable units of measurement).

- **Modelling:**
Hybridization involves building a statistical model to combine the different data sources.

- Governance of sources:
A hybrid measure presupposes a clear framework, and in particular the greatest possible transparency on shared data.

Main hybrid methodologies

"In Data Science, the term hybridization does not have a single, universal definition"

In Data Science, the term hybridization does not have a single, universal definition. It is used to designate statistical methods for reconciling data from different sources, or even combinations of several statistical methods. There are several main families of methods, each of which meets distinct needs.

A. Statistical matching (or data fusion)
This approach, based on imputation techniques, involves bringing together several databases to create an enriched, coherent and more complete dataset. It is used when no single source contains all the useful variables of interest and the different data sources cannot be directly matched using a common identifier.

The aim is to reconstitute a database similar to what would have been obtained if all the variables had been collected on the same individuals. Database matching is based on the similarity of individuals on a set of common variables in the different databases: we define a distance between individuals in the different databases and then match them on the basis of their similarity

- Benefits: this approach makes it possible to limit the "response burden" of panellists or interviewees and to reconstitute a complete database similar to the original dataset and therefore easy to use in conventional data analysis tools.

- Limitations: variables specific to each database are never observed jointly. The quality of the fusion therefore relies heavily on the explanatory power of the common variables on the specific variables. In the absence of relevant common variables, the fusion will be close to random.

B. Calibration
This approach is used when there is a source of data from a sample or panel and another source of exhaustive measurement. In this case, the aim is to use the information from the exhaustive measurement, which corresponds to a known total for the entire population, to improve statistical precision, reduce the variability of

results or correct a selection bias in the sample or panel. The approach consists of introducing additional calibration constraints into the adjustment of the sample or panel.

- Benefits: this approach ensures the consistency of the two data sources without having to modify their structure. In addition, it does not require access to the raw data from the exhaustive measurement, which is often very large in volume, but only totals on the calibration variables.

- Limitations: the different data sources must be perfectly comparable, which is not always the case natively. Pre-processing may therefore be necessary to ensure consistency between the perimeters measured and the indicators calculated.

C. Profiling

This approach is used when you have a source of data from a sample or panel and another source of exhaustive measurement, and you want to enrich the exhaustive measurement with the often very rich information from a sample or panel. Exhaustive data allows us to observe uses that are still rare or occasional and that a sample cannot measure accurately.

The approach consists of building a statistical qualification model on the sample or panel data and then applying it to the exhaustive data to enrich it.

- Benefits: this approach improves our understanding of emerging or rare uses without having to significantly increase the sample size.

- Limitations : As exhaustive data is generally collected in silos, the explanatory variables available for modelling are relatively limited, which constrains the ability of a model to estimate profiles reliably.

D. Synthetic population generation

Synthetic population generation is not specific to hybrid approaches, but it can be used as a preliminary step to reconciling different data sources. It is particularly useful when at least one data source comes from an exhaustive measurement. This approach was originally used for spatial analysis at a fine level. It consists of building an exhaustive and representative set of the population on which the results of surveys or panels and data can be distributed. This redistribution can use deterministic methods when a common identifier is available between the different sources, or stochastic or probabilistic methods otherwise. The fusion and qualification techniques described above can be applied to a synthetic population, as can probabilisation techniques.

- Benefits: This approach makes it possible to combine different sources without necessarily using strictly comparable universes, and makes it easier to preserve the characteristics of the original data. This means that very detailed individual data can be used on a large scale, without running up against the problems of managing data privacy.

- Limitations: The quality and conformity of the synthetic population are highly dependent on the quantity and granularity of the information made available by the national statistical institutes. Secondly, as with any model-based approach, the reliability of the results depends on the explanatory power of the common variables on the specific variables.

A systemic and governed approach

Hybrid measurement is not just a question of technology: it is a **systemic approach**, which presupposes agreements with the players who share their data, common methodological choices and transparent standards. It requires **strong governance**:

- Interoperability of formats and definitions.

- Transparency and auditability of models by independent third parties.

This is what distinguishes a genuine hybrid measurement from a simple juxtaposition of figures.

Hybrid measurement is neither an end nor a fad: it is a necessity in a media world that has become too fragmented to be captured by a single instrument. It makes it possible to articulate different visions, to construct a more complete, more nuanced and more credible measurement. It still has to be intelligible. The challenge for the coming years is as much technological as it is educational: explaining the models, documenting the methods, making the metrology of complexity legible.

The challenges inherent in **hybrid measurement**

The benefits of hybrid measurement are many and undeniable, as we have just seen. Greater granularity, stability of results, measurement coverage, cost optimisation.... are all undeniable benefits that are becoming essential as media usage evolves. However, hybrid models and approaches face a number of challenges.

Data access
This is probably one of the biggest challenges in building hybrid measurements. Data is everywhere, but collecting it is complex. It is subject to very strict legal constraints, particularly in a context requiring the reconciliation of data from different sources. This data can be of great value to the players who collect it. Apart from the cost of accessing data, many players refuse to share their data. This data may also represent a challenge for publishers and require additional contractual agreements between the player being measured, the player collecting the data and the measurer. Legislation is gradually evolving in this area, and a growing number of European texts refer to the need, under certain conditions, to share data with a neutral and independent third-party measurer. This is particularly true of the European Media Freedom Act. In addition to these legal and contractual issues, there are the potential complexities of accessing data according to the technical configurations and architectures specific to each player. Another challenge is the sustainability of access to data, which is subject to changes in legal constraints, the strategies of the various players and technologies.

Consistency of data
(in terms of scope covered or definition of indicators) Hybrid approaches involve bringing together different sources of panel and return path data, and also different sources of return path data. Implementing these data combinations can lose all meaning if meticulous work is not carried out beforehand to adjust the perimeters and definitions. Trying to calibrate a panel measuring television in the home (including connected and non-connected TV sets) with a return path data whose results include channel usage included only in the CTV environment is doomed to failure. The hybrid model will produce results, but they will be seriously biased.

Data standardisation
Once the problem of data access has been resolved, the problem of data standardisation and certification arises. This is an important issue, especially as it involves local and international players. Many questions arise: Who sets the standards and framework for auditing? Who finances it? Who makes it? The existence and quality of such standards and audits are essential if hybrid measurement is to be produced.

Sample size
By their very nature, hybrid systems have been designed to go beyond the limits of samples in terms of granularity. In the world of hybrid measurements, we can sum up by saying that census data provides consumption levels, while panel data provides the individual dimension, profile and duplication. The quality of the panel data is therefore a fundamental element of any hybrid measurement

Connecting data
A number of hybrid approaches require publisher data to be connected to panel data. Against this backdrop of hybridization, the introduction of data clean rooms (secure environments in which data can be cross-referenced) would seem to be an appropriate way of enriching panel data with available data. This technique obviously requires prior consent from users (panel and data). This work represents a significant effort (from a

technical and legal point of view), especially as the number of data sources to be aggregated is large.

Richness of the data
In probabilistic hybridization methods, you need to be able to rely on common variables to reconcile the data. The quantity of common variables and their explanatory power will influence the quality of the hybrid model.

Intelligibility of models and consistency of results
Hybrid measurements involve statistical models based on assumptions that are sometimes difficult to verify. What's more, even if the measurement operator is very transparent about the methods used, certain types of model, particularly Deep Learning models, are difficult to interpret because the relationships between the explanatory variables and those to be explained cannot be expressed simply. Furthermore, unlike panel data, which is based on the observation of actual behaviour, any model is a simplified vision of reality which cannot therefore capture all the diversity and complexity of reality. The adoption of a hybrid measurement by a market therefore depends on the confidence of all players.

Estimating precision
It is fairly straightforward to estimate the statistical precision of survey results and calculate confidence intervals. But when it comes to results from a hybrid measurement, estimation is complex, if not impossible. Analysing changes in results over time is therefore more delicate and requires the use of tools other than traditional statistical tests.

Sampling big data

While combining the terms «big data» and «sampling» may seem like a paradox, it reflects a new reality for a growing number of data analysis and return-path data tools.

Analytics systems were originally designed to offer reports and usage analysis with the highest possible granularity. Their purpose was to capture and report on every single usage event exhaustively.

These systems, as previously mentioned, addressed the demand for a new generation of measurement in an era defined by targeting, personalization, and audience fragmentation.

However, collecting millions—if not billions—of usage events comes at significant financial and carbon costs for the storage and the processing of that data. Even as cloud computing lowers processing expenses, using a complete dataset to calculate complex reports can be prohibitively expensive. Furthermore, processing such an exhaustive amount of data can significantly increase the time required to generate reports.

"Collecting millions - if not billions - of usage events comes at significant financial and carbon costs"

Consequently, many analytics platforms have implemented sampling algorithms. In these cases, the reports provided to the user are based on a representative sample of events rather than the entire dataset. These tools typically display the sampling rate and the resulting margin of error.

Examples of **hybrid measurement around the world**

Numerous hybrid systems combining data and panels have been developed around the globe. The following examples provide a non-exhaustive overview of these initiatives.

Hybrid systems in France as measured by Médiamétrie:

To date, hybrid systems combining data and panels have been developed for a number of audience measurement purposes..

Internet measurement
For the past ten years, Médiamétrie Netratings' Global Internet measurement has used a database of the volume of visits to more than a hundred sites and applications to calibrate the audience results from its panel. Hybridization input data from third-party analytics tools (e.g. Piano, Wysistat, NSP, Experian, etc.) are certified monthly by the ACPM (Alliance des Chiffres pour la Presse et les Médias, the french ABC). The hybrid scope covers all digital screens, in all locations, in mainland France. Hybrid audiences are published monthly, covering more than 5,000 brands and 1,000 applications.

Cross-Media Advertising Measurement
Since January 2025, Médiamétrie's Cross-Video advertising measurement (Watch) has incorporated a hybrid production system based on impression volumes derived from AdServers' data in order to measure the contribution of CTV to linear TV. The project already includes data from broadcasters and will include data from Netflix, Amazon & Disney. To accelerate the development of its Cross-Media Video advertising solution, Médiamétrie announced a partnership with Audience Project in September 2025. The agreement will combine Médiamétrie's methodological expertise and proprietary data with Audience Project's technological assets, which are already integrated into the market's main platforms. Scheduled for release in Q1 2026, Cross-Media Video advertising measurement will provide an "accurate" assessment of de-duplicated coverage and campaign repetition across all channels, including major platforms, social networks, connected TV and online video, and a unified view of campaign performance.

Segmented TV / Adswitching
Within, the linear TV mediaplanning, a system has been developed to enable GRPs for TV screens to be corrected on a weekly basis by substracting impressions delivered through segmented TV / Adswitching. It uses Adservers logs and impressions to do the correction.

Médiamétrie's other hybrid measurement projects:

For other products and services, Médiamétrie may also use external data to supplement, enhance and optimise existing measurement systems. This data makes it possible to broaden the scope of coverage, refine the indicators and meet specific market needs in terms of precision, granularity or frequency.

POC of hybridization of the measurement of thematic TV channels using set-top box data
(Proof of Concept for TV measurement) Between 2021 and 2024, Médiamétrie conducted **a proof of concept (POC)** in collaboration with the main French operators - Orange, SFR, Bouygues Telecom and Canal+ - to explore the integration of data from set-top boxes into the live measurement of thematic TV channels. To do this, Médiamétrie recruited a panel of households from each operator and set up a daily collection of operator data. A great deal of work

has been done to standardise data operators by processing their data (cleaning, clipping, etc.). At the same time, Médiamétrie carried out a number of methodological projects, including model iterations, increasing the number of Médiamat panels, and fusion and individualising operations.

The hybrid data produced proved to have many benefits. The levels measured were very close to the TV currency. Additionally, the number of cells with zero ratings and the overall stability was significantly improved.

But this POC also highlighted a few challenges associated with hybrid measurement, in particular:

- The legal aspects, with GDPR requirements and the need to integrate multiple partners,
- The complexity of standardisation and quality of input data,
- The complexity of the French audiovisual landscape, marked by a multiplicity of players, modes of consumption and overlapping offerings, as well as a significant proportion of DTT reception with no return path,
- The market's ability to accept the impact a methodological break,
- The question of funding, particularly when return path data needs to be acquired.

In October 2024, Médiamétrie, in consultation with market players, took stock of the POC and decided not to continue exploring the universe of thematic TV channels.

Further exploratory work is underway to pursue the objective of hybridising the results of television audience measurement. The POC was limited to linear TV data. Other data sources and methods are explored and collected to build a hybrid system of on-demand audiences.

Hybrid digital radio measurement project (EAR Insights Digital)
Tests are underway to produce a measurement that combines the EAR Insights audience measurement panel used for radio mediaplanning with data certified monthly by the ACPM on the consumption of live digital radio and webradios (data from the Content Delivery Network used to stream live audio).

Hybrid measurement of platforms (Watch)
The Watch measurement produced by Médiamétrie is based on panel data captured at home through a streaming meter. The measurement collects data through Wifi usage at home on all connected screens for streaming platform audiences.

To extend the scope to all locations and all screens, Médiamétrie is going to propose, following a test period, a hybrid approach including logs and the volume of global consumption in the second half of 2025. To achieve this hybridization, two sources of data can be used, either measurements from the SDK, or server side data provided by the platforms (which requires an audit to validate the scope measured).

International hybrids: some key examples

Examples of TV measurement

Austria - AGTT
In September 2024, Austria launched a new TV audience measurement system that uses a combination of traditional panel data and connected TV data via HBBTV technology – (widely used in Austria). The digital data comes from the collection of data from 100,000 participants in a representative panel and 1,000,000 connected televisions and set-top boxes. This data is supplemented by data from a panel of 3,200 participants in a TV measurement study. This information is used to calibrate and check the models. This hybrid approach not only reduces fluctuations in results, but also reduces

the proportion of results which, due to a lack of precision in measurement, result in the display of a zero. This audience system is linked to the channels AdServers (advertising servers) to enable advertising to be targeted in real time (along the lines of segmented advertising in France).

This new measurement is the new official benchmark for audience figures.

Italy – Auditel

Auditel began measuring TV audience in 1984. The sample size was doubled in August 1997 and tripled in June 2017 following increasing audience fragmentation: the Auditel SuperPanel™ is nowadays composed of 16,100 collaborating households. Three main objectives have been reached with the SuperPanel™:

1. increased granularity when measuring small, thematic and local broadcasters;

2. greater stability when measuring bigger broadcasters: the bigger sample size has permitted to reduce the expansion factors by two thirds as well as the so-called confidence interval;

3. lastly, the Auditel SuperPanel™ enables to take an accurate high-definition snapshot of the Italian society and its socio-economic classes, defined according to dynamic and ordinal logic instead of the mere possession of goods.

The sample which forms the Auditel SuperPanel™ is the sum of two samples: the People Meter Panel (PM) and the Set Meter Panel (SM). Let's look at the difference. The People Meter Panel (PM) counts 5,682 households. The Set Meter Panel (SM) counts 10,294 proportional households. Both the SM and the PM include households without TV and households.

The data in the Set Meter Panel is collected without details on who is watching (no remote to declare the presence in front of the screen). This information is modelled using data from the People Meter Panel.

Switzerland - Mediapulse

In Switzerland, Mediapulse launched a hybrid TV audience measurement system on July 2022 to meet expectations for more accurate results.

The Mediapulse system combines two main sources of data:

- TV measurement panel:

A representative sample of Swiss households (1,870 households), equipped with measuring devices, provides detailed data on television consumption.

- Digital decoder data:

Data from around 160,000 set-top boxes supplied by operators such as Swisscom and Sunrise (formerly UPC) provide information on television usage. This data is anonymised and modelled to create a «virtual panel» of 15,000 profiles.

These two data sources are combined by modelling to create a more refined measure. The hybrid system applies to linear TV data as well as to digital ads on CTV.

The results of the measurement are first published the day after the broadcast, based solely on the panel results.The hybrid dataset is published three days later. It should be noted that these data are the benchmark. Data published the day after the broadcast are referred to as "temporary".

Hybrid data has been used as currency for planning, reporting and trading since 2022.

Spain

In Spain, Kantar Media is in the process of switching to a new hybrid measurement system combining panel with big data. Working with HbbTV measurement supplier Konodrac, this new system fuses CTV linear census data with the panel data to improve stability and reduce zero ratings to negligible amounts. It has been successfully audited by the AIMC authority in Spain and the Control Commission that governs the currency Kantar Media provides in Spain are currently in the process of ratifying the switch to this new system.

Canada - Numeris
In Canada, the government, in a CRTC decision, required cable operators to make data from their set top boxes available to Numeris, the local television measurement company. Numeris has been working for a number of years to produce a measurement that complements the reference TV measurement. At this stage, this measurement is published alongside the reference measurement.

In April 2024, Numeris launched its new hybrid measurement of linear television, called Enhanced Television Audience Measurement (Enhanced TAM or eTAM). This approach combines traditional panel data with data from set-top boxes.

Enhanced TAM is based on the following sources:
- TV measurement panel:
Based on 4,500 households, 11,000 individual panellists via the PPM (Portable People Meter).
- Return path data from set-top boxes (operators):
These data come from samples of tens of thousands of households selected from the subscribers of the various operators. It is therefore not an exhaustive set of return path data.

These two data sources are then combined by fusion. The hybrid sample is limited in size due to the limitations of the reporting tools.
The benefits of this hybrid approach are as follows:
- More comprehensive audience measurement, thanks to the integration of data from channels available via cable operators, which are not necessarily covered by the traditional panel.
- Greater stability of results, made possible by a larger volume of observations,
- The decline or disappearance of zero audiences for certain channels, time slots or targets,
- Cost savings by modelling panellists without having to recruit them directly from the panel.

The audience results from this hybridization are available in a separate database for analytical purposes. To date, Enhanced TAM is not the reference currency. The data is used in parallel with conventional TAM, and the market is in the process of adopting hybrid as the reference currency. Numeris has also developed a Video Audience Measurement (VAM) system. This service covers the consumption of video content on linear television, OTT services, SVOD, streaming, etc.

In September 2025, Numeris rolled out this solution nationwide, providing a more comprehensive overview of video consumption habits across the country. VAM is also based on a hybrid system (Panel + data) that is partly interwoven with Enhanced TAM. Enhanced TAM facilitates better fusion and attribution between linear television and digital video audiences as part of VAM (Video Audience Measurement).

United States - Nielsen
Nielsen has recently published a new measurement of television: Big Data + Panel. This system was accredited by the MRC in January 2025, and the data is being used as currency measurement for the 25/26 season, starting in September 2025. The traditional measurement, based solely on a panel of households and persons, is available for currency measurement until the end of 2025 for calendar year deals only.

Nielsen's Big Data + Panel measurement is based on the following sources:

TV measurement panel: 42,000 households, or more than 101,000 individuals.

Sources for Big Data:
- Anonymised data from millions of TV set-top boxes, connected TV sets and streaming platforms,
- Return path data (RPD) from cable and satellite decoders,
- Smart TV automatic content recognition (ACR) data,
- Proprietary data from participating streaming services for live events (eg: Amazon Prime for the NFL).

The hybrid model is based on attributing the audience device to individuals and projecting it onto all viewers. All the indicators delivered

as part of the panel measurement alone are available in the Big Data+ Panel measurement. However, the hybrid data is delivered one day later than the panel audiences alone (i.e. after two days). Hybrid measurement in the United States mainly concerns the TV screen, with the integration of other devices under development but not yet widespread.

Sweden - MMS
Sweden was one of the first countries to leverage return path data to develop BVOD measurement. In 2011, MMS released its first BVOD measurement using analytics data. Over the following years, MMS developed new services and capabilities, merging these data with linear TV data.

French-speaking Africa – Médiamétrie / Canal+
In nine French-speaking African countries, Médiamétrie has deployed an innovative audience measurement system based on a hybrid approach on behalf of its client Canal+. The system is based on the collection of technical logs from the boxes owned by a panel of more than 8,000 Canal+ subscriber households recruited in the main towns and cities of the 9 countries covered by the study, supplemented by a declarative survey carried out among some of these households. Field teams equip the set-top boxes in recruited households with 3G/4G USB dongles that transmit usage data (such as channel changes, viewing times, etc.).. This usage data is then transformed into a television audience, and then into an individual audience using an advanced statistical model based on hidden Markov chains to determine who is in front of the TV set. This model takes into account the composition of households (the family ties between each member, the number of people, gender, age etc...), the viewing habits declared by each member, and the format / genre of the various channels that make up the television offering in the countries covered.

This makes it possible to estimate precisely who is watching what, and when. The measurement covers more than 240 channels, with granularity down to the second, and provides weekly day-dated results at national and pan-African level. This system gives Canal+ a detailed view of audience behaviour, which is essential for steering its content, broadcasting strategies and the marketing of advertising space. This is a major step forward in this market, with unprecedented practical applications such as single-day audience analysis for a specific program, media plans optimized to the exact day, and post-broadcast campaign reports for agencies and advertisers.

Other projects underway

The subject of hybrid TV measurement is not limited to these few countries: it is under discussion in many other countries where tests/ POCs are being carried out.

Germany - AGF
In Germany, AGF announced a project in 2024 with UTIQ to create a system for combining panel data with a graph of large-scale identifiers (UTIQ has developed a solution using data from several major telecoms operators in Europe).

United-Kingdom - BARB
BARB, which operates television measurement in the UK, launched a call for tenders in May 2024 to develop the integration of return path data into its television measurement system. The project BARB Panel Plus relies on three components:

- Methodology:
Design of an adapted hybridization method to combine panel data with return path data, proprietary server data and BVOD census data.
- Data processing and delivery:
Development of software to process data according to the hybridization methodology, on schedule and on demand.
- Data supply:
Sources of TV consumption data, such as return path data and proprietary server data, to be hybridised with panel data.

In addition, for several years now, BARB has been proposing a system for hybridising BVOD data (replay): this is the Dovetail project. The Dovetail model is based on BVOD census data, while the

Barb Panel Plus project aims to enhance this approach by also integrating return channel data from boxes and Smart TVs, as well as proprietary (first-party) data from publishers.

Cross-Media measurement case study

WFA - Origin (UK) / Aquila (USA) projects
In 2019, the WFA published a manifesto on cross-media measurement. This defines a set of key principles that have since been adopted by a large part of the profession. This manifesto also led to the launch of a major project (with a UK version, Origin, and a US version, Aquila) to implement the main principles of this new measurement.

At the heart of the measurement system is a new approach to process audience data, the Virtual ID model, which combines the benefits of using highly accurate data from the AdServers of different partners, without generating privacy-related problems. These are known as synthetic population models. Until now, when analytical data was used in a hybrid measurement project, the aim was to remove all sensitive elements of this data that would allow the identification of individuals (such as IP addresses, for example, or specific profile elements) from which it was derived.

Conversely, in a synthetic population model such as this one, this information is not destroyed, but transformed and assigned to virtual individuals, mirrors of each individual in the population measured. So in the Origin project, there are as many virtual IDs as there are people living in the UK. This transformation guarantees the anonymity of the data, enabling compliance with privacy protection legislation while retaining the finesse of the input data. Each log of data is fed into a virtual population, the analysis of which paves the way for new generations of measurements.

The implementation of the Aquila and Origin projects required1 significant investment to design the technical systems needed to collect and process this data.

Given its ambition and scope, the project is often referred to as the north star of Cross Media measurement.

Finland - SpotOn
SpotOn is a cross-platform video advertising currency in Finland that combines linear TV, streaming and online video.Its methodology revolves around a single-source reference panel created by enriching the national TV panel with the ad-server impressions linked to its homes, members and devices.That single source panel is then used as a “learning ground” to model each step of the measurement process.

The system is designed to respond in near-real time to user requests by tailoring a cascade of models for each task.

Outcomes are delivered via a web application or an API, and include precise estimates of contacts, deduplicated reach & frequency, and reach build-up for any required age/gender target group.

The SpotOn measurement system is owned and produced by the JIC Media Metrics Finland Oy (MMF).

International – Kantar Media Campaign Audience Validation (“CAV”)
In 2021, Kantar Media launched Campaign Audience Validation (“CAV”) in Brazil and Colombia, and has since launched in five further markets across Latam, Europe and SE Asia, with more markets in the pipeline. The service delivers campaign audience performance metrics daily to advertisers, such as reach and demographics, currently across linear TV and digital media. This is achieved by using linear ad exposure data from the linear currency service and receiving ad exposure data from digital platforms through different methods including direct ingestion and panel exchanges. The solution is tailored to each local market reflecting local requirements and locally available assets.

Examples relating to Radio measurement

Australia – GfK Radio360
In Australia, a new Radio audience benchmark was launched in June 2023. Radio360 is based on a hybrid system combining three data sources:

- Declarative measurement panel using weekly online diaries, involving 50,000 people each year, to gather information on the overall audience for radio and its stations,
- Automatic measurement panel of 2,000 panellists equipped with the GfK MediaWatch,
- Gfk tags and radio logs to measure live listening on digital media (streaming).

The core pillar of this measurement remains the audience diary, which provides the overall audience levels for the stations and the medium. Return path data and data from automatic MediaWatch measurement are used to refine the results according to listening mode.

Return path data, supplied directly by publishers (logs) or collected via a GfK tag, is profiled using MediaWatch measurement. This hybrid data determines the contribution and profile of online listening (streaming) within the overall level of radio listening measured by logbooks. In this way, the overall audience levels derived from the audience log are preserved.

Examples relating to Digital measurement

UK – Ipsos iris / UKOM
In the UK, Ipsos IRIS is the reference measurement of online brands, endorsed by UKOM. The system is based on three main data sources: a scoping study, a panel of 10,000 individuals with a passive measurement system, and site-centric data from participating sites incorporating data from around 100 million terminals. Site-centric measurement is based on third-party cookies combined with a fingerprint solution to facilitate cross-device identification. Panellists' devices are also identified, enabling a link to be made between panel data and site-centric data. The methodology consists of using these data sources to create a synthetic population of around 1 million people whose habits represent those of the UK population.

International - Nielsen DAR (Digital Ad Ratings)
This service provides the audience of digital campaigns using Nielsen tags and server-side integration with data from platforms and data partners, as well as survey and panel-based demographic measures to improve the accuracy of the assigned demographics. The measurement is used to report the audience (reach, demographics) of online campaigns. Its combination of multiple data sources is a clear illustration of hybrid methodologies.

Artificial intelligence: new perspective for measurement?

A **new era** for audience measurement

"AI is often evoked as the promise of a wider field of possibilities"

Artificial intelligence (AI) is revolutionising all sectors of the economy, and audience measurement is no exception. In an increasingly fragmented media environment, where data is massive, heterogeneous and often incomplete, AI is often evoked as the promise of a wider field of possibilities and new analytical perspectives. This chapter explores how AI could transform audience measurement, drawing on concrete use cases and raising the methodological and ethical issues involved.

AI: what are we talking about?

There are multiple definitions of AI, which vary depending on the field of expertise, the objectives, and the associated use cases.

AI is sometimes presented as an enhanced version of Data Science. AI and Data Science are in fact two distinct disciplines, even if they share common theoretical foundations and have areas of overlap, such as machine learning. The main difference is their purpose: Data Science aims to understand, explain, analyse or predict, whereas the primary purpose of AI is to reproduce complex tasks processed by human intelligence. These disciplines are therefore complementary, and AI is not intended to replace traditional statistical methods, but rather to increase analysis capacity by automating complex tasks, facilitating the processing of massive volumes of data and opening the way to more effective predictive models.

The European Regulation on Artificial Intelligence (AI Act) defines an artificial intelligence system (AIS) by its inference capacity, i.e. its capacity to generate predictions, content, recommendations or decisions, and its capacity to infer models or algorithms, or both, from data. Techniques that enable inference when building an AI system include machine learning approaches and logic- and knowledge-based approaches that make inferences from encoded knowledge or the symbolic representation of the task to be solved.

In Computer Science, AI refers to a set of techniques and algorithms designed to automate tasks associated with human intelligence, such as reasoning, learning or understanding language. Here are some of the main families of techniques and their objectives and areas of application.

1. Machine Learning

Machine learning is a field of artificial intelligence that involves learning from data without having to specify any prior rules or relationships. This is what distinguishes machine learning models from traditional statistical models. Depending on the nature of the data, different techniques can be used:

Supervised learning when the learning data is labelled, for example to qualify and enrich customer log data from panel data.

Unsupervised learning, where the training data is unlabelled and the aim is to discover hidden relationships, for example to segment behaviour, detect anomalies or identify recurring patterns in the data.

2. Deep Learning

Deep learning is a sub-category of machine learning based on **neural networks**, models inspired by the workings of the human brain, composed of layer of data. This mechanism makes it possible to process large volumes of complex or unstructured data (images, sound, text), particularly in content analysis, and to solve tasks such as translation or image recognition. Deep learning uses neural networks with many hidden layers and is used, for example, for classification or modelling complex functions.

3. Generative AI
Generative AI is a specific field of AI devoted to content generation (text, image, sound, video, etc.). It uses **deep learning** and **natural language processing** (NLP) to learn from massive data sets and create new content. Generative AI models have been around for several years. Their use has grown exponentially since ChatGPT 4 was discovered by the general public. The number of applications and uses for these tools has since multiplied (creation of code, images, videos, music, presentations, etc.).

AI in market research

AI tools can be used to automate repetitive tasks in the various stages of market research. In particular, they can facilitate questionnaire preparation (questionnaire/interview guide creation, translation), data collection (chatbot, AI agent, etc.), data analysis (coding, transcription, processing, modelling) and reporting.

The use of chatbots developed to collect data still raises many questions and faces numerous limitations. Although voice generation and the quality of expression have now reached a very high level, it is still impossible to envisage entrusting CATI questionnaires to machines, either because of the initial hook required to convince a respondent to answer or because of the complexity of an audience questionnaire.

When it comes to rendering, however, generative AI opens up promising prospects. We can now envisage accompanying each delivery of results with automatic summaries that extract the key points: the main developments put into perspective, the key trends identified, the elements requiring particular attention pointed out. This enhanced first reading improves the efficiency of the results analysis process. Generative AI could also be used to access the data in the form of chatbots, enabling users to interrogate the interface with questions formulated in natural language rather than complex queries.

In 2024, Ipsos launched an AI-based research analysis tool: The PersonaBot. This tool allows you to interrogate the results of a study by interacting with virtual interviewees, instead of consulting tables of results

AI and synthetic data

Synthetic data is artificial data, i.e. data that does not come directly from the observation of real individuals or events, generated by statistical models to reproduce the characteristics and properties of real data.

Synthetic data is often associated with AI, but originally it was a technique that enabled national statistical institutes to disseminate very fine, analytically rich data to researchers, while guaranteeing confidentiality and respect for privacy. The theory surrounding the generation of synthetic data is not new, as its main principles are based on imputation methods. Imputing missing data, fusion of data and modelling of profiles can be likened to generating synthetic data.

Synthetic data generation methods have evolved considerably with the development of learning methods, as they are often used to train machine learning models. The SMOTE (Synthetic Minority Over-sampling Technique) algorithm, developed in the early 2000s, reduces the bias of learning databases by adding synthetic data for under-represented groups. Generative AI now makes it possible to create unstructured synthetic data.

Synthetic data in market research

The use of synthetic data in market research gives rise to a number of high hopes. Some see this as an opportunity to reduce the cost of research by replacing part of the actual interviews with synthetic interviews, while others promise an increase in the accuracy of results on rare or hard-to-reach targets by increasing the size of these targets using synthetic interviews. But these new methods are still far from being the subject of a theoretical consensus in the field of surveys. Although imputation or fusion approaches have long been used to supplement or enrich survey or panel data, replacing real respondents with synthetic respondents still raises a number of questions, particularly about the gains in precision, but more generally about the validation protocols to be implemented.

In June 2025, the AI working group of Syntec Conseil's Research commission published a position paper clarifying the terminology used to describe synthetic data and detailing some of the methodological, ethical and legal issues involved.

This position paper is in line with Syntec Conseil's "Manifesto for the responsible use of AI in consultancy firms", a version of which was published for the research industry in May 2025, endorsed by Médiamétrie and a dozen other companies.

Synthetic data and hybrid measurements

Depending on the approach adopted, hybrid measurements can be similar to the creation of synthetic data. This is particularly true of modelling approaches or approaches based on synthetic populations. The greater the number of data sources to be connected, the greater the distance between the output of the hybridization process and the original data. This creates virtual individuals that cannot be directly compared with those actually observed.

The WFA's cross-media measurement model is based on this concept of a synthetic population, known as the "Virtual ID model". The synthetic population is used here as a basis for connecting massive individual data from different sources and panel data. The use of this synthetic population model enables platforms and media players to share and link databases containing sensitive individual data, without compromising their confidentiality, and while complying with the laws in force.

The questions raised earlier about the validation protocols to be implemented remain open for this type of approach, especially as we do not always have a «source of truth» on a perfectly equivalent perimeter to estimate the quality of the duplication results between the sources obtained at the end of the process.

This also implies that in a world of data panel and samples remains a key asset. They are the only and necessary "source of truth" of our industry, able to connect, validate and deduplicate the sources of data.

Ethical issues, transparency and **explainability**

"The requirement for explicability becomes central"

AI introduces a new form of methodological opacity. The most complex models are also the least readable. This complexity raises a number of questions:

- How do you audit an AI model?

- How can we guarantee non-discrimination in estimates?

- How do you explain an AI-based methodology to non-technical stakeholders?

The requirement for explicability becomes central. So-called "white box" methods (decision trees, regressions) are sometimes preferred to more opaque approaches (deep learning) to ensure that the model can be understood.

In addition, the **quality of the input data** remains the foundation of reliable AI. A model trained on biased or unbalanced data will produce results with the same defects and may even accentuate them.

Finally, compliance with **personal data protection** rules (GDPR, anonymisation, consent) is a non-negotiable prerequisite.

Artificial intelligence does not replace metrology (the methods and techniques used to obtain greater reliability of measurements and ensure their comparability), it transforms it. It opens up unprecedented possibilities for estimating and anticipating audience behaviour.

But it does not dispense with rigour, and in fact requires greater transparency and dialogue between disciplines: statistics, IT, sociology and economics. Integrating it into measurement frameworks entails making clear choices, adopting explicit methodological trade-offs, and ensuring strong governance.

In a world where media behaviour is constantly changing, AI is less a magic solution than a **new tool for adaptive metrology**. A powerful and demanding tool, and one that will play a key role in defining tomorrow's standards.

"AI is less magic solution than a new tool for adaptive metrology"

Accessing audience data through **AI**

AI, and particularly LLMs, is set to revolutionize access to audience measurement results. Currently, consulting this data requires the use of specialized and often complex tools and interfaces. AI promises to replace these rigid systems with direct and intuitive interaction.

Thanks to natural language prompts, media professionals will be able to simply «converse» with the data to obtain analyses. This approach will make exploiting the results faster and accessible to a greater number of users.

The major challenge, however, remains the methods for sharing this data with these tools. Today, audience measurement players do not share their proprietary data, which makes LLM responses on this topic poorly documented or unreliable. The key role of AI in the world of measurement will therefore depend on the development of a new model (technical and economic) allowing LLMs to access these databases in a secure and verified manner.

Hybrid & AI in the eyes of the experts

Koenraad Deridder
General Manager, CIM

Reinventing measurement: Hybrid. Modular. Cross-media.
Center of Information on Media (CIM) is a rather unique body, as it has been a multimedia Joint Industry Committee (JIC) since its inception. This allows us to pool resources and have a professional team in a small market. This has also made it possible to achieve certain synergies between studies, for example by having a single establishment survey. Or digital measurement that includes sites and applications as well as video players, for example, whose results have been combined with TV audience and time-stamp research since 2020 to provide a "total video rating" per programme on a daily basis.

But a genuine cross-media approach was lacking. Last year, our members decided that CIM needed to undergo its "Copernican revolution" and move from a media-centric to a consumer-centric logic, with the aim of following consumers across all media and platforms.

The CIM ONE
With this in mind, we decided to integrate all our studies into a single hybrid and modular research framework, **CIM ONE**. It consists of five modules.

The **Golden Standard**, which has already been published, describes the population in terms of equipment and general media consumption, and serves as a reference for the study universe.

The **ONE panel** brings together the TV panel and a new smartphone panel, making it possible to measure as much media consumption as possible, with the same people, both at home and away from home. In both panels, we measure offline media via audiomatching and all online media, respectively with the GfK router and the Realitymine meter (by Ipsos).

The third module, the **Data Exchange**, compensates for the statistical limitations of panels that are always too small by integrating sets of big data. First and foremost the Gemius internet census, but we also commissioned dataBreeders to implement a complete video post-buy solution, combining linear TV and proprietary adserver data for online video to produce a unified campaign evaluation.

All these solutions use a single set of modelling and data science tools and a single production platform. It is the fourth module, called the **Personification Engine**, which enables "device" data to be personalised and profiled.

Finally, the fifth module is the single database in which all the reports are run. We have chosen a **virtual population** approach.

« A Large Media Model »
With this, we want to respond to the profound changes in the expectations of advertisers, agencies and media over the last few months. Our members now expect us to support their "predictive intelligence" approaches. They need to be able to predict what consumers will see, hear or read, what they will think and feel, and how they will react. These insights need to be continually updated by real-time "signals" in their AI-enhanced "connectivity systems".

Our virtual population must therefore become our own **"Large Media Model"**, integrating with the **"Large Marketing Model"** (as WPP calls its system) of its members. Fortunately, with CIM ONE, we have the necessary resources.

Thanks to our **Golden Standard**, we can define the reference population for the models. **Data that predicts what people see, hear or read** has always been our core business, and we will remain the

single source for offline media data. We expect our members to have their own digital metrics (outcomes), but we can provide them with data covering the whole online landscape to help them calibrate and benchmark.

There is also a demand from the market to incorporate **"qualifying factors"** such as efficiency and visibility scores. We already do the first in our Total Video Advertising (ToVA) planner, and the second in our out-of-home study.

Our OOH study also gives us experience in **Activity** Based Modelling (with a matrix that forecasts the 188 million journeys made by Belgians in an average week) – another pillar of the new systems – and experience in delivering all the data in real time via a **CIM API** into members' transaction systems.

So it looks like we'll be able to stay relevant in this new world enriched by AI, as we already have many components and expertise in-house, thanks to our multimedia focus. When the CIM was created in 1971 from the merger of two press JICs (which had existed since the 1950s), our founders were very visionary.

Pete Doe
Chief Research Officer, Nielsen

Nielsen's Use of AI in U.S. TV Audience Measurement
Artificial Intelligence (AI) in various forms is employed extensively by Nielsen in products and processes. Nielsen uses large language models across the organization, enabling more efficient code writing, knowledge sharing and production of internal and client facing materials.

AI is also embedded in our products, including ad Intelligence, TV and digital measurement, outcome measurement and planning. This document focuses on Nielsen's use of machine learning AI in our U.S. big data + panel measurement calculation methodology. This methodology integrates 45 million big data homes with Nielsen's 42,000 homes/100,000 persons panel to provide what we believe to be the most accurate and precise measurement of U.S. TV audiences.

Big data has scale but also gaps. Nielsen uses Return Path Data (RPD) from cable and satellite set top boxes and Automatic Content Recognition data (ACR) from smart TV's and the two data types have their own specific challenges, as well as some common ones.

Gaps include : Missing content, Device on/off (particularly for Set Top Box RPD), Household composition/demographics, Persons viewing...

In both cases, identifying common homes and devices (big data homes that are also panel homes) is a foundational element of triangulating panel and big data, using the more complete panel measurement as a model input to fill in the big data gaps.

Common homes are identified using privacy-compliant matches on personal information (names and addresses, IP address) and machine learning to identify common devices within these homes based on consistency of tuning patterns.

These common homes and devices, along with other relevant panel data, are then used for model training to address the following issues:

Missing content:
Nielsen uses machine learning on common homes and devices to recognize the patterns associated with missing tuning in big data homes. This powers a daily process to identify homes that are likely to have missing tuning and remove them from use in measurement.

Set Top Box On/Off:
A well-known issue with RPD from set top boxes is the lack of direct information about what is on the connected TV screen. The TV can be off or tuned to other inputs while a cable box remains on. Nielsen uses machine learning trained on common homes to identify where the set-top box is on but it is likely that the TV set is off.

Household composition/demographics:
RPD and ACR data that Nielsen uses is not supplied with characteristics or demographics. This information is an essential part of TV measurement and is needed for the assignment of persons audiences – who lives in the home helps determine who is viewing.

Using third-party assigned characteristics and demographics is insufficient: Nielsen studies have found this data to be incomplete in places, and to have lower accuracy. Nielsen uses these third-party characteristics, along with tuning in big data homes and tuning information and demographics of Nielsen panel homes, as inputs into a recurrent

neural network and mixed integer programming technique to identify the characteristics and demographics of big data homes.

Persons viewing:
The assignment of viewers onto big data tuning is an essential part of the measurement. A key feature in Nielsen's model is the room location of the device: a TV set in the main living room will have a different set of viewers than a TV set in a bedroom. Set location information is contained in Nielsen's panel measurement but not in big data, so we use a machine learning model to assign a room location classification to the big data devices, which is then used as a feature in the probabilistic viewer assignment model that assigns persons' viewing.

Khaled El Serafy
Head of Data Science, BARB

From Okner to AI: The Quest for Hybrid Measurement

The year is 1972. Atari has just released Pong, a black-and-white arcade game that will be played on the monochrome televisions still common in Britain (only half of UK households own a colour set). IBM has come out with the floppy disk, which for now is strictly limited to business computing, since the first personal computer is still years away.

1972 is also the year that Benjamin Okner published a paper in the Annals of Economic and Social Measurement: "Constructing a New Data Base from Existing Microdata Sets: The 1966 Merge File." In it, Okner noted the growing demand for disaggregated economic and demographic information, made possible by the rise of "electronic computers".

Okner's approach was to use "computer matching", which combines two different datasets based on shared variables to create a richer synthetic file. An early prototype of what we now call data fusion.

Okner's paper is one link in a chain that runs straight through to the hybrid audience measurement systems now in flight or under construction across Europe and beyond.

A Brief History of Data Fusion

Data fusion methodologies have been evolving over the decades, with several contributions coming mostly from purely statistical papers or economic research rather than audience measurement. The field has progressed from Mahalanobis' (1936) similarity metrics which are still used today in audience measurement data fusions, and Okner's 1970s merge file, to Rodgers' 1980s simulations showing risk of bias and Renssen's 1990s calibration methods. In more recent decades, information on data fusion has appeared in textbooks, errors and limits have been clarified, and particular attention has been paid to integrating big data under privacy and representativeness constraints.

For over 50 years, statisticians have been wrestling with the same challenges we are facing today in hybrid TV measurement: how to combine sources with different strengths, reconcile person-level with device-level data, and produce usable outputs under uncertainty.

Much of this research, however, has happened outside the world of television audience measurement; in economics, official statistics, agriculture, and marketing research (which is adjacent to TV audience measurement). Has the TV audience measurement branch of data fusion research become detached from the tree trunk it once grew out of? Have we drifted away from engagement with decades of academic debate on data fusion?

Hybrid audience measurement systems do not tend to situate themselves in this lineage. Methodologies are proposed, they are theoretically validated by experts in the field, and outputs are evaluated empirically by executives, researchers, sales teams, and statisticians. In that sense data fusion is approached with due diligence, but the connection to the broader scientific tradition is thin. If audience measurement is expected to make real breakthroughs in "the age of AI", we cannot be content with just demanding the use of the latest technology when building new hybrids, but we should also consider how we can reconnect with the body of research on data fusion that has been steadily evolving since the 1970s.

Two Schools of Thought in Hybrid Measurement

At this point, it's worth noting that "data fusion" is not the only way when it comes to hybrid measurement. There are two broad schools of thought when it comes to the question of combining panel data with big data to produce a better audience measurement.

The first school is like a quest for the Holy Grail: a single, multipurpose fused dataset that is greater than the sum of its parts in every way. The idea is to combine panel data with big-data sources (CTV, STB, VOD apps) into one modelled dataset that can answer any question: programme ratings, cross-platform reach, channel-switching behaviour, currency-grade spot ratings, and just about anything else we currently rely on the panel for. The attraction is that it's self-consistent, has infinitely flexible outputs, and combines the best of the panel (representativeness, person-level detail, breadth) with the best of big data (scale, immediacy) without really making compromises. The risks are that these models can be complex, opaque, and hard to validate across all use cases. If one element is wrong, it can undermine trust in the whole system.

The second school of thought is more pragmatic. Instead of one universal modelled dataset, you design separate hybrid methods for specific outputs. For example, one for overnight spot ratings, another for long-term channel reach, another for co-viewing factors. For everything else, you lean on the panel. The upside is that it's easier to trust: each individual output can be validated independently, benchmarked against the panel, and audited by industry committees. The downside is inconsistency: the spot ratings from one output may not align with the programme ratings within which they were broadcast from another output. The scope of it is also limited, each time you need a new report, you may need to invent yet another hybrid methodology.

Barb's Dovetail Fusion is a good example of the Holy Grail method. It combines BVOD census data with panel data using a data fusion technique to produce a modelled panel viewing file. CFlight is a good example of the second, more pragmatic approach. Ad-server logs are combines with panel data, but they produce very specific reports on post-campaign performance.

Data Fusion in the Age of AI

As the techniques for processing and analysing data become more advanced and accessible, the attraction to chase the Holy Grail approach to hybrid measurement grows stronger. Imagine plugging in all the datasets we have available to us: panels, surveys, digital census datasets, and letting advanced AI techniques produce a universal audience dataset, faithful to its inputs and usable for any analysis. Whether we can achieve that would then depend on our appetite for risk as well as our capabilities as data scientists and statisticians.

The debates among academics of data fusion over the last fifty years, particularly in the field of economics, offer a caution here. The story of data fusion seems to be one of evolution as well as revolution. It is not the case that a revolution in data science and AI has occurred such that we can simply say: plug the datasets into the latest technology and simply crank the handle to get reliable results.

However we choose to approach data fusion, we are grappling with issues already mapped in the literature, including:

- Bias versus variance trade-offs:
Fused datasets can reduce variance by borrowing strength from big donors, but potentially at the cost of introducing bias.

- Matching error:
Error can be introduced depending on the quality of the "fusion hooks" as well as the matching algorithms used.

- Uncertainty quantification:
We need frameworks to measure and decompose the error introduced by matching, distinguishing it from ordinary sampling error.

- Partial identification:
In many cases, some relationships between variables cannot be uniquely recovered; instead, methods can only bound or approximate the plausible range of outcomes.

A stronger connection to these roots of data fusion research can mean a reduced risk of reinventing the wheel or repeating past mistakes.

Here are a few examples of what AI and data science techniques now bring to the table. These are not listed to propose the use of these particular techniques. The point is that they require careful, context-specific application.

- Representation learning:
Neural networks and latent variable models can discover hidden audience segments and behavioural routines from big data.

- Imputation at scale:
Generative models (VAEs, GANs) may be able to fill in missing demos or co-viewing, constrained by panel distributions.

- Domain adaptation:
AI can correct for covariate shift. For example, transferring patterns from smart-TV owners to non-smart TV households.

- Data assimilation:
Borrowed from weather forecasting, AI can reconcile multiple noisy “sensors” (panel, ACR, STB) into one state-space model of viewing.

- Simulation:
With synthetic populations and agent-based models, AI can simulate daily viewing diaries for every household in the country.

Selecting, combining, and using these techniques successfully is difficult if we treat data fusion as a merely commercial enterprise. It is also a scientific and engineering challenge, one which our colleagues across various industries and across the decades have been working on, and continue to work on.

“The Holy Grail of a universal, multi-purpose hybrid measurement may well be possible”

This white paper by Médiamétrie is an important step towards treating hybrid measurement as an evolving scientific discipline which requires serious joint-industry, and even cross-industry, collaboration. Initiatives by the MRC on joint-industry standards for accreditation of hybrid measurement solutions are also encouraging. Perhaps a cross-industry collaboration, via academia, with our colleagues working on data fusion in economics, would be helpful.

The Holy Grail of a universal, multi-purpose hybrid measurement may well be possible. It could keep the best of panel measurement as well as embraces big data from connected TVs, set-top boxes, and VOD / video sharing services, and could be considered in the end to be a straightforward improvement to all industry stakeholders. In the same way that we consider metering-based solutions to be better than diary-based ones, all things considered for the industry, we may one day see hybrid measurement be universally accepted as a better version of a panel-only measurement. We should treat it as the major scientific and engineering challenge that it is, and we may be able to reach it by “standing on the shoulders of giants”.

Dierrick Gray
Chief Research & Operations Officer, Numeris

The Canadian Experience with Hybrid Measurement
Measuring audiences in today's fragmented media landscape is increasingly difficult yet crucial. As traditional TV viewership declines, Numeris has introduced the Enhanced Television Audience Measurement (ETAM) system in Canada, a hybrid system leveraging return path data from Set-Top Boxes. This section summarizes Numeris' implementation of ETAM, its benefits, challenges, and importance for future audience measurement.

Understanding Hybrid Measurement and ETAM
Hybrid measurement combines methods like panel data, return path data (RPD), and digital census data to better capture media consumption. Numeris' ETAM solution merges traditional panels with large-scale RPD for more detailed and accurate insights into Canadian linear TV viewing.

Why Hybrid Measurement?
Hybrid measurement delivers unique advantages:

- Broadcasters: More accurate and stable data enables better insights across channels, programs, and time frames.

- Advertisers: Easier to target campaigns in both broad and addressable settings.

- Numeris: Larger samples at lower costs, with better integration, attribution, and channel coverage.

What ETAM Brings to the Industry
- Improved Stability: ETAM's hybrid measurement reduces fluctuations in audience estimates, producing reliable data for audiences of all sizes and supporting informed decisions.

- More Accurate Measurement of Younger Audiences: Hybrid methods boost viewership data for younger groups—AMA increased by 8% (ages 2–17), 4% (18–34), and 5% (25–44)—showing panels may underrepresent these viewers.

- Addresses Zero Ratings Audiences: Combining return path data with traditional panels captures fragmented or small groups previously missed due to sample size limitations.

- Reports the complete TV landscape: Numeris' panel relies on audio watermarks to track TV viewing. Only encoded channels are measured. Measured stations grew from 796 to 1,745, raising Total Hours Tuned by 1.4%. With STB data added, Numeris now tracks all channels, yielding more comprehensive audience insights.

Challenges in Implementation and Use
Integrating panel data with large-scale passive sources like RPD is technically complex, requiring advanced modeling and consistent validation to harmonize varied datasets.

- Trust-building and relationship management with new BDU stakeholders became essential as Numeris relied on multiple providers for audience estimates. These stakeholders had never shared data before, nor did they see value in it. At the same time, these different BDUs each require unique relationships and continuousunderstanding of their data and technology.

- ETAM's hybrid approach brings improvements but demands industry trust; some expected uniform gains in viewing volumes, but results have been mixed. The complexity of hybrid measurement creates challenges in understanding and building

consensus. The industry has been used to more easily understood methodologies and the complexity of the new system made trust difficult.

- Implementing and maintaining ETAM requires major investment in technology and new expertise. The ever-changing data also presents challenges and the need for flexibility in a system.

- Developing a scalable system capable of handling large, complex data sets is key but presents ongoing challenges, especially for smaller organizations.

"As hybrid methods become industry standard, unifying data sources, staying transparent, and ongoing communication matter."

The Future of Hybrid Measurement in Media and Numeris'Learning

Numeris' ETAM shows the pros and cons of hybrid audience measurement. Integrating big data boosts insights and adapts to changes in the media environment, but early tech investment and client involvement are vital. Weak infrastructure caused issues, and unclear integration led to skepticism. A Client Advisory Board would have sped up adoption and improved transparency. As hybrid methods become industry standard, unifying data sources, staying transparent, and ongoing communication matter. Hybrid solutions like ETAM are essential for precise media analytics, helping tackle fragmentation, complexity, and cost.

Dr. Mirko Marr
Head of Research, Mediapulse

Hi-Res TV in Switzerland - Up and Running and Expanding

Faced with a high level of audience fragmentation the Swiss tv marked asked Mediapulse, the Swiss TV JIC, to develop a solution for more granular and more stable tv viewing data. By combining panel data with data from set-top boxes, Mediapulse delivered this solution, which was launched in 2022 and accepted as currency for planning, reporting and trading. Furthermore, the hybrid data platform enabled Mediapulse to measure digital video ads on connected TV sets and to integrate this data into the TV currency since autumn 2023.

The development of hybrid TV measurement in Switzerland, also known as hi-res TV, was carried out by Mediapulse and guided by a panel-first approach. This means, that TV panel data provided by Kantar Media, based on a sample of 2'000 households, is considered as the source of truth for TV viewing and serves as the reference to train viewing data from set-top boxes.

Training set-top box data includes exclusion of invalid viewing events, estimation of household structures behind single set-top boxes and attribution of viewing events to estimated household members. This results in a virtual set-top box panel with second-by-second viewing data from around 300'000 virtual panel members, derived from ca. 150'000 set-top boxes (contracts) provided by the two largest TV distributors in Switzerland.

Integration of virtual panel data into TV panel data, resulting in a hybrid tv panel, is based on an imputation approach and operated by Mediapulse on a daily basis. Viewing data is delivered to the market in two steps. TV panel-only data is published the next day as preliminary data, while hybrid data becomes available after three working days and is regarded as the currency for planning and trading. In case of missing or invalid set-top box data, a fallback to preliminary data for the affected days is foreseen.

Compared to panel-only data, hybrid measurement in Switzerland leads to a substantial reduction in ad breaks with zero ratings, a slight increase in daytime ratings a decrease of affinity outliers, more stable data for planning and more plausible data for analysing program viewing, especially for long-tail channels.

Measurement of digital pre-roll and mid-roll ads, delivered by ad servers to set-top boxes, follows the logic of the hi-res TV approach, i.e. it combines panel and set-top box data but uses different measurement techniques. Video ad contacts are identified in the TV panel via encrypted watermarks and in the set-top box data via implemented log file information.

Hybrid data for TV and video ads is delivered to the market in one integrated dataset, giving advertisers and agencies the opportunity to quantify de-duplicated reach and frequency figures for planning and reporting cross-platform TV/video-campaigns.

Andrea Mezzasalma
Founder & CEO, dataBreeders

Hybrid Media Measurement in the Age of AI: Opportunities and Boundaries

First, a semantic clarification around the term "AI." In a broad interpretation, AI may include many advanced machine learning methods, including non-neural techniques such as KNN, random forests, and gradient boosting. However, for the purpose of this document, we restrict "AI" to deep learning (neural networks with many nodes and layers), large language models, speech-to-text, computer vision, generative AI, and related approaches.

At dataBreeders, we already use LLMs extensively to enhance productivity, e.g. for coding discovery, user support, documentation, translation, text refinement, etc.

In the domain of hybrid measurement, our current position is not to replace our core models with AI. Rather, we aim to harness advanced AI to improve the end-to-end infrastructure and workflow, while preserving the robustness of our core modelling.

Core hybrid measurement models

- For our core hybrid models, we currently rely on a mixture of non-neural methods, such as: Statistical modelling based on well-known distributions (e.g. compound Poisson, compound binomial), trained via machine-learning methods like k-fold cross-validation

- Generalised linear models (e.g. log-linear, logit, etc.)

- KNN (K-Nearest-Neighbours)

- Gradient boosting

Over time, these models have proven several advantages relative to "advanced" AI methods:

- Strong performance even on relatively small training datasets (e.g. "single source reference panels")

- Greater transparency and auditability, in contrast to "black box" models such as pre-trained LLMs

- Ability to leverage underlying causal relationships that are more likely to persist over time, rather than purely associative patterns that may be spurious or shift in later periods

- Predictability and controllability: we can estimate accuracy and precision ("bias" and "variance" in ML lingo), and regression to the mean, and accurately implement specific choices to enhance any of these qualities, or strike the best balance between them.

Given all this, we have no short-term plans to replace these tools with deep learning solutions (which, after all, have been existing for decades) or pre-trained LLMs.

However, we remain open to reevaluation. Should future requirements emerge that our current tools cannot satisfy, or should AI methods become sufficiently dependable and transparent, we may reconsider.

Feature detection and enhancement

Instead, we focus on leveraging AI for feature detection and feature enhancement. No model output can exceed the quality of its input data, and in contexts like media measurement, AI can greatly assist in summarizing and classifying content (text, synopses, audio, video) into genres, moods, orientations, and more).

For example, if we can more accurately classify the content viewed on a family's TV, we can better estimate the probability that different

family members are watching it, and infer their demographic profiles.

In this domain, AI wildly outperforms humans in terms of scalability and consistency across platforms. Accordingly, we are actively experimenting with AI-driven modules to complement our core measurement pipeline and raise overall quality.

Synthetic respondents

Another promising application of generative AI is the construction of synthetic respondents, i.e. generating microdata that resemble real datasets while minimizing disclosure risk of actual individuals.

However, in general, we remain cautious about synthetic respondents. Where possible, our preference is to retain personal data in protected, segregated environments and deliver on-demand reports via APIs or reporting tools. In fact, we assume that synthetic respondent generation will inevitably degrade some of the complex correlations in the original data and also, quite obviously, synthetic respondents cannot be used for targeting and optimization.

Nonetheless, to be prepared for future client requirements, we are proactively experimenting with models such as GANs, VAEs, and LLMs, as well as more traditional strategies like randomly omitting a portion of original data and inferring replacements.

It should be noted, though, that we do not regard synthetic respondents as a central modelling method in hybrid measurement. Rather, we treat them as a tactical option (applied upstream or downstream of the core modeling pipeline) to ensure compliance with privacy requirements, if needed.

Empowering Users with Natural-Language Prompts

Finally, we are developing LLM-based reporting tools that use natural-language prompts to interface with our APIs and endpoints, thus preserving the principle of multi-party computation in segregated environments to ensure maximum data security.

Zuber Nosimohomed
Chief Product and Business Officer - Kanta Media / TechEdge - President

A Tale of Two Cities: panels and digital data together deliver better results
Audience consumption is increasingly fragmented across devices and platforms. Measurement shouldn't be. Hybrid measurement – combining panels and digital data – delivers clear, comparable, accurate and transparent data. Simply put, they need each other:

- Panels directly observe what a nationally-representative sample of real people are watching – across any device – in a way that is agnostic on media source, and privacy safe.

- Digital data is large-scale, granular information capturing what is watched on every single device.

Without digital data, it is difficult to accurately measure everything audiences watch. On the other hand, digital data without a people-based ground truth will be always subject to biases, lack comparability and independence ... modelling can only take you so far.

How it works – at the core of the "recipe" are fusion and calibration methods
A good hybrid measurement system needs to blend best-in-class methodologies, privacy-first technologies, and simple, easy-to-use client tools. Whilst many of these components can be global in nature, it is critical to always reflect local market needs.

These measurement systems will take one of two approaches (or a combination):

- Fusion – merging datasets to create rich data outputs, including both digital data and panel measured data.

- Calibration – adjusting already rich digital datasets to reflect an independent people-based 'ground truth', measured by the panel.

In both cases, these approaches can be enhanced with synthetic data and privacy-first technologies to ensure accuracy while protecting user privacy.

Additionally, hybrid solutions are only valuable if the data can be easily accessed and used by customers, so analytic tools must be able to process large volumes of data to give users meaningful insights in a timely manner. This is not yet the case for many of the tools available in the market today and this can be a blocker to rapid adoption of hybrid measurement.

Localisation – examples of how hybrid measurement approaches are tailored to meet specific local market needs with success

Netherlands: NMO has a bold vision for cross-media measurement, and aims to combine TV, online video, audio, press, and in the future OOH data. Through this partnership, we combine our TV panel and BVOD data, and work closely with NMO, Ipsos and others to deliver a total view of audiences with accurate deduplication.

Norway: In Norway, we work with the Media Owners Committee to merge two complementary panels – in-home and out-of-home – and calibrate BVOD census data to provide a single, daily picture of broadcast and streaming audiences for both content and advertising ratings, in and out of the home.

Brazil: Our Cross-Media Planner tool integrates and calibrates panel data with YouTube data,

providing a next-gen planning tool to agencies and advertisers that is grounded by a single-source panel not just probabilistic modelling, with the granularity of real-time dynamic data.

UK: In the UK, we partner with Barb to calibrate panel and BVOD census data utilising virtual expansion to give a single view of broadcast content consumption across all screens. Building on top this, Barb's next move with Panel Plus intends to additionally fuse set-top-box and Connected TV data to provide more precise TV ratings.

UK and US: On behalf of the Origin and Aquila programs, we integrate panel data with ad exposures from digital platforms (with more data sets and media types planned) to provide post-campaign results through a unique, privacy-first way leveraging "Virtual ID modelling".

AI – Instead of replacing, AI complements and enhances hybrid measurement solutions

AI and advanced analytics are transforming measurement systems end-to-end including (i) the entire panel lifecycle; (ii) data science developments by imputing data to fill gaps, developing predictive tools and other cutting-edge approaches; (iii) in end-client tools to massively simplify how to extract insights from complex data sets.

Using AI in a transparent, explainable and auditable way as well as complying with emerging new regulation, will make hybrid measurement systems more efficient and accurate. It can also take privacy to the next level, enabling new techniques that avoid exposing individual-level data, and solve critical issues across channels, like differing taxonomy. However, AI relies on high quality input data from digital and panel sources, so AI is most likely to complement, rather than replace, hybrid data solutions.

In summary...

Hybrid measurement combining panels and digital data gives the best of both worlds by providing the independence, transparency, accuracy and comparability that broadcasters, advertisers, agencies, and platforms need. By combining the right data, in the right context, in the right way, hybrid measurement can bring clarity to a complex media landscape. And the measurement industry needs clarity...

"Using AI in a transparent, explainable and auditable way as well as complying with emerging new regulation, will make hybrid measurement systems more efficient and accurate."

Mario Paic
Chief Research Officer, Audience, Measurement, Ipsos

As discussed in this white paper, the audience measurement industry has a rich history of innovation and evolution of its core methodologies. These advanced approaches have long moved beyond solely relying on sample-based direct observation of individuals' behaviours through surveys or panels and have started to integrate multitude of data sources. Since the early efforts to integrate in-home scanning data or consumer surveys into TV currency datasets to enhance targeting and attribution capabilities, to the first 'currency-on-currency' data fusions designed to create cross-platform publisher brand reach, data integration has been a crucial component of audience measurement.

Today, an increasing number of audience measurement currencies utilise fully developed hybrid methodological frameworks, especially those that merge panel data with comprehensive, census-level datasets collected through RPD or ACR technology, third-party web tags and SDKs etc.

Over time, these methods have greatly benefited both from advancements in data science as well as the expanded availability of cloud computing, allowing for more sophisticated approaches, leveraging growing volumes of data collected through diverse range of technologies.

Ipsos has been at the forefront of these developments and has developed some of the first industry endorsed hybrid methodologies with our pioneering work on Out-of-Home (OOH) audience measurement currencies around the world. Creating an OOH currency involves the intricate task of combining a large number of data sources (e.g. GPS enabled travel surveys, traffic counts, digitalised mapping data etc.). This complexity presents unique challenges, particularly in integrating and modelling all data into a cohesive dataset, while maintaining the statistical integrity of each individual data source.

Building on these advancements, we have further refined our methodologies with a recent focus on leveraging synthetic data.

In today's context, the term 'synthetic data' can encompass various definitions. It is important to highlight that the use of synthetic data in audience measurement distinctly diverges from recent use cases in the broader market research sector. Specifically, it differs from those applications utilising generative AI to extrapolate insights from synthetic data.

“Understanding people’s behaviour through direct observation utilising proven methods such as high-quality representative panels and surveys, will continue to play a critical role in building trusted audience measurement systems going forward’

We utilise synthetic data in a form of a representative, privacy-preserving, synthetic population and use it as the integration layer that brings together panel data, census signals, and server-to-server integrations. Various data integration techniques can be employed to integrate the datasets, depending on the use case and the type of data (e.g. aggregate or disaggregated data). Layers of weighting and calibration ensure fidelity, while rigorous quality checks and transparency keep the methodology accountable. Crucially, these datasets are produced to prevent re-identification, meeting privacy obligations without sacrificing analytic utility. All this enables us to create deduplicated, granular reach and frequency, consistent reporting via APIs and user interfaces, and credible currencies clients can plan, evaluate, and activate against.

The prime example of utilising this approach is Ipsos iris, the online measurement currency in the UK and Australia where the data from passive single-source panels is combined with various data sources into a representative synthetic population dataset.

Industry wide adoption, and market acceptance, of currency data that combines traditional independent measurement with various other data sources, including the ones collected and provided directly by media owners and platforms, produced via advanced data modelling and integration techniques, including the use of synthetic data, demonstrates that the transformation of audience measurement systems is already underway. It is likely that this transformation will need to continue, and potentially accelerate, due to advancements in AI and its impact on how content and advertising are produced, distributed and consumed.

Having said that, at Ipsos, we believe that understanding people’s behaviour through direct observation utilising proven methods such as high-quality representative panels and surveys, will continue to play a critical role in building trusted audience measurement systems going forward, not despite but because of advances in AI and its potential impact on the industry.

Summary and next steps: Hybrid & AI to meet the new challenges of measurement

Summary and next steps: **Hybrids & AI to meet the new challenges of measurement**

In a context of increasing delinearization and fragmentation of uses, the boundaries between linear broadcasters and streaming platforms are blurring, and the logic of convergence is accelerating. For audience measurement providers, this transformation translates into growing complexity and a need for adaptability in measurement protocols.

"Hybridization is not a theoretical concept"

Faced with progressive digitalization, the arrival of new players, and the diversification of distribution models, audience measurement must prepare to integrate a growing data component to meet the challenges linked to the insufficient precision of panels in estimating the consumption of ever more fragmented uses.

The hybridization of panel data with other data therefore seems to us to be an inevitable and widespread evolution. Hybridization is not a theoretical concept. The future of audience measurement is already here and it relies on those new hybrid methodologies. The overwhelming majority of new Total Video and Ad Cross measurements rely on both Panel / Sample data and Big data. The HALO Cross Media framework or the new Nielsen Big Data TV measurement are clear illustrations of this trend. As we uncovered it in this paper, this will allow measurement to address three key challenges: extending the reach of measurement, addressing media fragmentation with more granular results at a reasonable cost, delivering results in a totally new ecosystem (AdTech in particular).
Building those measurements require multiple datasets to function. Accessing those datasets raise multiple questions. A growing number of media and digital regulations are addressing the issue. Joint Industry Committees and Audience Measurement companies are well equipped to create the necessary norms and audit those data. But a new era of collaboration should emerge. Audience measurement systems were built as independent silos, from one media to another and from one country to another. If local media measurement remains key and should keep a form of sovereignty, there is a clear need to connect them. Streams of data flowing from the platforms are global. Advertisers are willing to get a global view. And with the growth of digital, regulation is also increasingly global (in particular in Europe). This implies more collaboration between the measurement players. A move that is clearly underway. The audience measurement coalition (AMC) that gathers many players from our industry is a clear signal of that.

"Panels are central because they have the role to bridge the various data together"

We tend to describe hybrid system as dual system combining datasets and panels. If it is factually true, panel should be seen as the central piece. Not necessary more important but central. Without them, we would not be able to build a measurement. Without datasets, we would build a measurement with a lower resolutions. Panel are central because they have the role to bridge the various data together (either directly or through the models that they will allow to build). Panels provide the necessary neutral and independent data to measure individual data and, duplication. As the WFA states it they are an independent and neutral "source of truth". Neutrality and independence is of course key to build trust. Duplication is necessary, because it is the key value that allows to stitch various datasets and count the number of individuals that have seen a content or an ad. Panels are of course challenged, because they are becoming harder to recruit and more expensive. But investing in them is an absolute necessity to deliver the next generation of hybrid measurement.

Since the launch of ChatGPT 3.5, AI has been emerging at a rapid pace and is setting the stage for a new digital revolution, accelerating the trends of usage fragmentation that have already been observed. But AI also promises new prospects for transforming measurement.

"But just as data did not replace panels, AI will not be the revolution some are expecting (...) the future will definitively be hybrid."

But just as data did not replace panels, AI will not be the revolution some are expecting. Synthetic panels are not a substitute for traditional samples. They are new models that help us advance hybrid methodologies further, using both samples as a source of truth and data. The future will definitively be hybrid.

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