THE POWER OF MOBILE DATA FOR EVENT ORGANISERS:

How to maximise audience insight from your app

crowdconnected

WONDERFUL COPENHAGEN

About this whitepaper

Commissioned by Wonderful Copenhagen and compiled by Crowd Connected, this whitepaper is for anyone involved in procuring a mobile app for their organisation's venue or event.

Featuring practical guidance and examples from real events in Copenhagen and elsewhere, this is a must read for any event organisation that knows there are opportunities for better data collection and analysis but is unsure how to turn mobile app-sourced data into valuable insight.

About Wonderful Copenhagen

Wonderful Copenhagen is the official tourism organisation for The Capital Region of Denmark, working to promote and develop both business and leisure tourism in The Capital Region of Denmark on a non-profit basis.

Wonderful Copenhagen is a commercial foundation funded by a mix of contributions from private businesses, organizations, and public institutions, including perennial financing agreements with The Capital Region of Denmark.

Furthermore, Wonderful Copenhagen is a network organization with more than 300 commercial partners, working to generate business for the tourism industry and the experience economy in Copenhagen and The Capital Region of Denmark.

For further detail see: www.visitcopenhagen.com/wonderful-copenhagen/copenhagen/who-we-are

About Crowd Connected

Crowd Connected is a leading mobile location data company based in the UK, whose acclaimed location intelligence software, Colocator, is used by leading visitor businesses worldwide. Through a simple plug-in, Colocator runs in the background of an event's or venue's official app, accurately tracking the location of visitors' mobile devices. Processing and visualising this rich stream of data, Colocator provides event organisers with a complete toolset to understand and influence people's movements.

Crowd Connected is proud to number among its diverse customer base leading Danish businesses including festivals such as Roskilde, Copenhell, Distortion and Smukfest, as well as Many Digital, a digital solutions business focused on football clubs that creates tailor-made fan experiences and engagement services through smart utilisation of data.

For further detail see: www.crowdconnected.com

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Introduction

Are you responsible for commissioning a mobile app for your venue or next event? Or contemplating an upgrade to your existing app? If the answer to either question is yes, this whitepaper is for you.

You'll recognise that your visitors increasingly expect you to provide a first-class mobile app – relying on it to give them an ever more immersive experience, where the digital is weaved into the physical. Before, during and after the event, a great app will be so much more than just a schedule or map. It will be a must-have, multi-functional, personalised digital companion for anyone attending. It will help elevate your event to a new level.

Like any investment, you'll want to maximise the return on your outlay – making the app as valuable as possible not only for your visitors, but also for you, the event organiser.

Our focus in this whitepaper is on how your app can deliver useful and valuable data that can be turned reliably (and quickly) into actionable insight. Think of it as smart data, driving smarter decisions.

No doubt you'll recognise that data and analytics are the lifeblood of effective customer understanding and engagement. But you may also be concerned that the volume of data generated at events can seem daunting. However, by most

definitions it's not 'big'. You'll find a lot of people talking about 'big data' in the event industry. But it's just a buzzword. With the right tools, collecting and using data from your mobile app can be simple and cost effective. Don't let the hype (whether it's talk of big data, machine learning or artificial intelligence) put you off.

In fact, if you collect just the right data you need, it might even qualify as 'small data'! And it can be all the more valuable for it. So, our focus in this whitepaper is on how your app can deliver useful and valuable data that can be turned reliably (and quickly) into actionable insight. Think of it as smart data, driving smarter decisions.

Whether that is to enhance the overall event experience for attendees, to provide reporting on facility utilisation across your venue/site/city, or to strengthen your commercial relationships.

Of course, first and foremost, your app should benefit your visitors. But it can also ensure you operate a better, safer, perhaps even a more profitable event. And the better you know your audience, the more successful your event will become.

In this whitepaper, compiled by Crowd Connected on behalf of Wonderful Copenhagen, you'll discover:

- Which visitor data is most valuable to you? How to categorise the types of data your app can gather, and what that data can be used for.
- How to maximise any data collection.
- How to map data sets to segment your audience, better

understand attendee behaviour and how to turn data into action.

- Which types of competencies you will need in house to benefit from the data.
- Hints and the tips you should follow in creating and executing a mobile app data collection strategy.

Featuring practical guidance and examples from real events in Denmark and elsewhere, this is a must read for any event organisation that knows there are opportunities for better data collection and analysis but is unsure how to turn app-sourced data into valuable insight, or how to take action on it.

One note on our choice of language. We'll principally use the term "visitors" to refer to those people who come to your event or venue(s). But we'll interchangeably use the words "attendees", "app users", "people" or even "customers" (because they may well be transacting with you). But they are all visitors in one form or another.

Why a mobile app can be a fantastic data collection tool

In this chapter we'll cover what you need to consider up front when thinking about visitor data and how your mobile app fits into your existing workflow. No doubt you'll already be collecting data on your visitors in some form. So, we start by covering how we might usefully categorise the types of visitor data that can be collected, why stakeholder consultation is crucial to setting a data strategy, plus the boring but important regulatory considerations.

2.1 Mobile data collection via an app

The number of ways to collect data about visitors is growing quickly. And the variety of ways that data can be used is growing too. Mobile data collection – the method of gathering any type of information using a mobile device, most often a smartphone or tablet – is just one, but a very important one.

Frequently, mobile data collection will be via an app, the name given to a software program that runs on the phone. For the purposes of this paper, by an 'app' we mean a native app, i.e. one that is installed directly on the smartphone and can work, to a greater or lesser extent, with no network connectivity. These apps are normally distributed to Android smart phones via Google Play and to iPhones via Apple's App Store.

This is different from a mobile-optimised website designed for a smaller handheld display and touch-screen interface. Native apps are able to perform a number of functions that are not available currently via a mobile-optimised website. Persistent location tracking is one example.

Why use mobile app data collection? There are immediately obvious advantages to mobile app data collection:

- **Ubiquity.** Smartphone penetration is (almost) universal. Your visitors all carry one. Unless your event requires attendees to hand in their mobile phone at the door, your visitors will have their device with them for the duration of their visit. They expect to use it. Efforts to make them switch off are likely to go unrewarded!
- **Expectation.** In an era dominated by social media, we have all been conditioned to expect the app to be free to download and free to use, in return for the provider of the app collecting certain data — as long as this data collection is proportionate and relevant to the activity encompassed by the app. In this way data is a form a currency — the user exchanging the value of the data given over for the value the app adds to their overall event experience. We'll return to maximising opt-ins for data collection purposes later (see sections 2.5 and 3.4).
- **Applicability.** Data can be gathered in a structured and systematic fashion, enabling data analysis to be performed on the information. As we will see, in some cases almost instantaneous insight to be obtained from this data.

Fig 2.1 Why use mobile app data collection?

- **Flexibility.** You can decide up front what data is important to your business, and ensure the mobile app is designed to facilitate this. Whether this is active data collection (for example in the form of a mobile survey) or passive data collection (for example, in-app analytics or background location tracking).

2.2 Categorising the different types of data you might collect

We have already referred to one way to categorise data collection, namely active and passive data collections. Active data collection – that is, where the person needs to engage in form filling or similar, may require incentivisation. Typically, this might be a free prize draw or similar mechanic. Passive data collection, by its nature invisible to the person, and is therefore less likely to require inducement.

Another way to categorise data that is to be collected is to look at when it is collected across the customer lifecycle: pre-visit, during the event and post-event. In particular, you may want to do this because data that is important to you can only really be harvested at a particular point in the event lifecycle.

Mobile app usage tends to peak in the build up to, and during the event. Indeed, many visitors will only download the official mobile app immediately prior to their visit.

So pre-event data collection may be better served through other channels. For example, registration may reside on your website (which of course might well be mobile-friendly and accessed via a mobile device) and/or via a third-party ticketing company or enrolment system.

Similarly, post-event usage of the mobile app tends to decline, unless specific functionality is included to extend the time-window of app user engagement. An example of this might

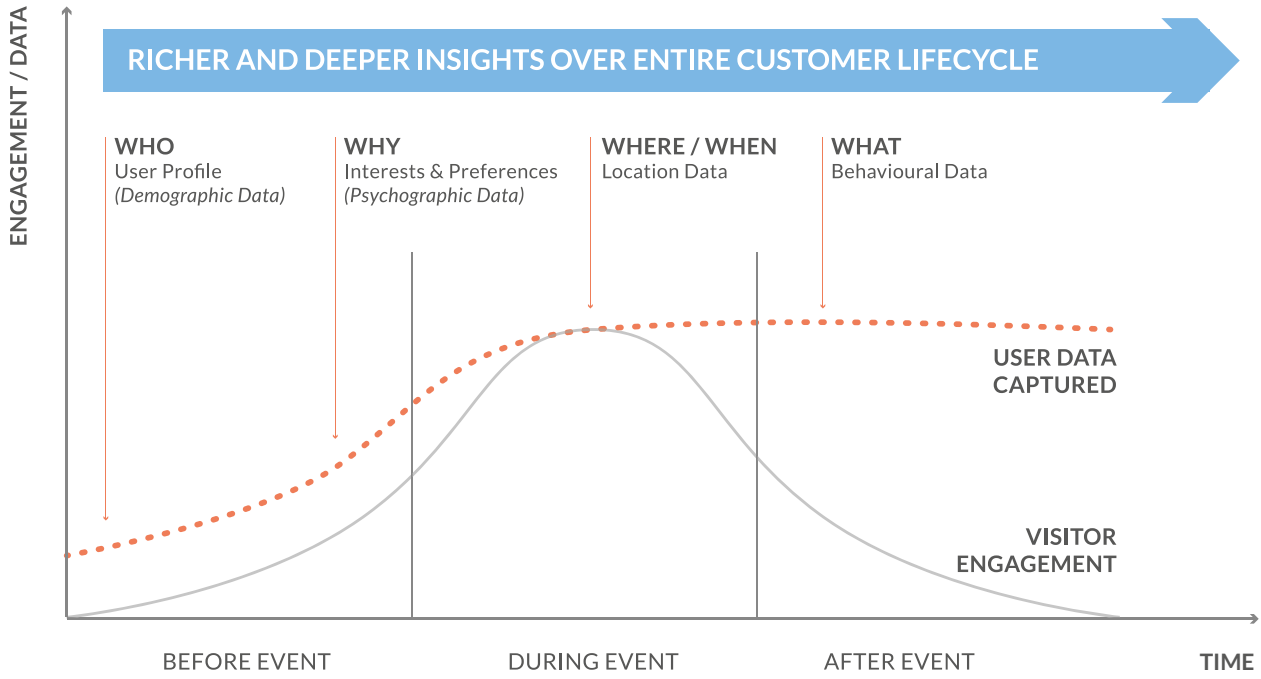


Fig 2.2 Where is data collected?

be curated content from the event, personalised to the user in the form of a 'digital scrapbook', or similar. Traditionally, post-event data has been collected via a survey – which might be delivered digitally via email (which should be less expensive than traditional paper surveys, because it reduces the costs associated with printing and form transportation, double entry, and data cleaning).

However, we think it is most useful to look at the different types of data we might seek to capture, whether through a mobile app or otherwise, by considering what types of questions we might want the data to address.

- **Who:** This is demographic data. It tells us who a person is, but nothing about their attitudes, or their behaviour.

  Frequently this is done via a registration form, perhaps as part of a ticket purchase process. But, of course, the ticket purchaser may buy tickets on behalf of friends/colleagues, whose demographic data is not necessarily captured. For example, a leading European music festival promoter estimates that for each ticket purchaser they have captured demographic data for, there are three additional tickets purchased during the transaction where they collect no such data.

  Think of demographic data as the hard facts about a visitor. Their age, income, job title, contact details, likes, etc. We'd also bundle in attribution data here – how people found out about the event. This can be invaluable for informing future marketing decisions and budgets.

  As we'll see in section 3, your mobile app provides a number of ways to capture the "who" element of visitor data.

- **Where / When:** This is location data. It tells us where someone was at a particular time. Crucially, this links the digital (the app) with the physical (the venue environment).

- **What:** This is behavioural data. It tells us what the person was actually doing there. Sometimes we might be able to infer this from in-app usage and/or location data. As an illustration, someone who bookmarked the keynote speaker session in the app, and who then also dwelt in the main seminar area for the entire duration of the keynote speaker's address, was almost certainly there to listen to the keynote speaker.

  But we should exercise caution in some instances. For example, at a trade show, just because a person is at an exhibitor's stand location does not necessarily mean that individual interacted with the exhibitor. They may have been loitering because they were having a conversation with a business associate that they bumped into, entirely independent of, and oblivious to, the exhibitor stand.

  Mobile app usage tends to peak in the build up to, and during the event. Indeed, many visitors will only download the official mobile app immediately prior to their visit.

  Other good examples of behavioural data might be when a visitor purchases something, or has their badge scanned. Data about these 'touchpoints' at the event can be stored. They can be used to understand the visitor's behaviour – not just where and when it happened, but what they did.

  Every event will have some digital presence these days,

whether it's a website, mobile app, social media activity, or email campaigns. Digital data from these touchpoints can be valuable. But it doesn't necessarily tell us about behaviour at the event venue. So, it's important to differentiate online behavioural data, and physical (or offline) behavioural data.

- **Why:** This is psychographic data. It tells us something about motivations – the reason a person behaved in a certain way.

  Psychographic data can only be collected through surveys because it needs answers to questions about people's attitudes. For instance, why people visited the event, and how satisfied they were.

  A mobile app may be able to facilitate collection of data which matches all of these categories. But even if the data collection occurs through a different channel or mechanic (for example, via an initial registration from on your website), it is entirely possible to map different data sets together, a topic we return to later (see chapter 4) as your mobile app can be critical to this.

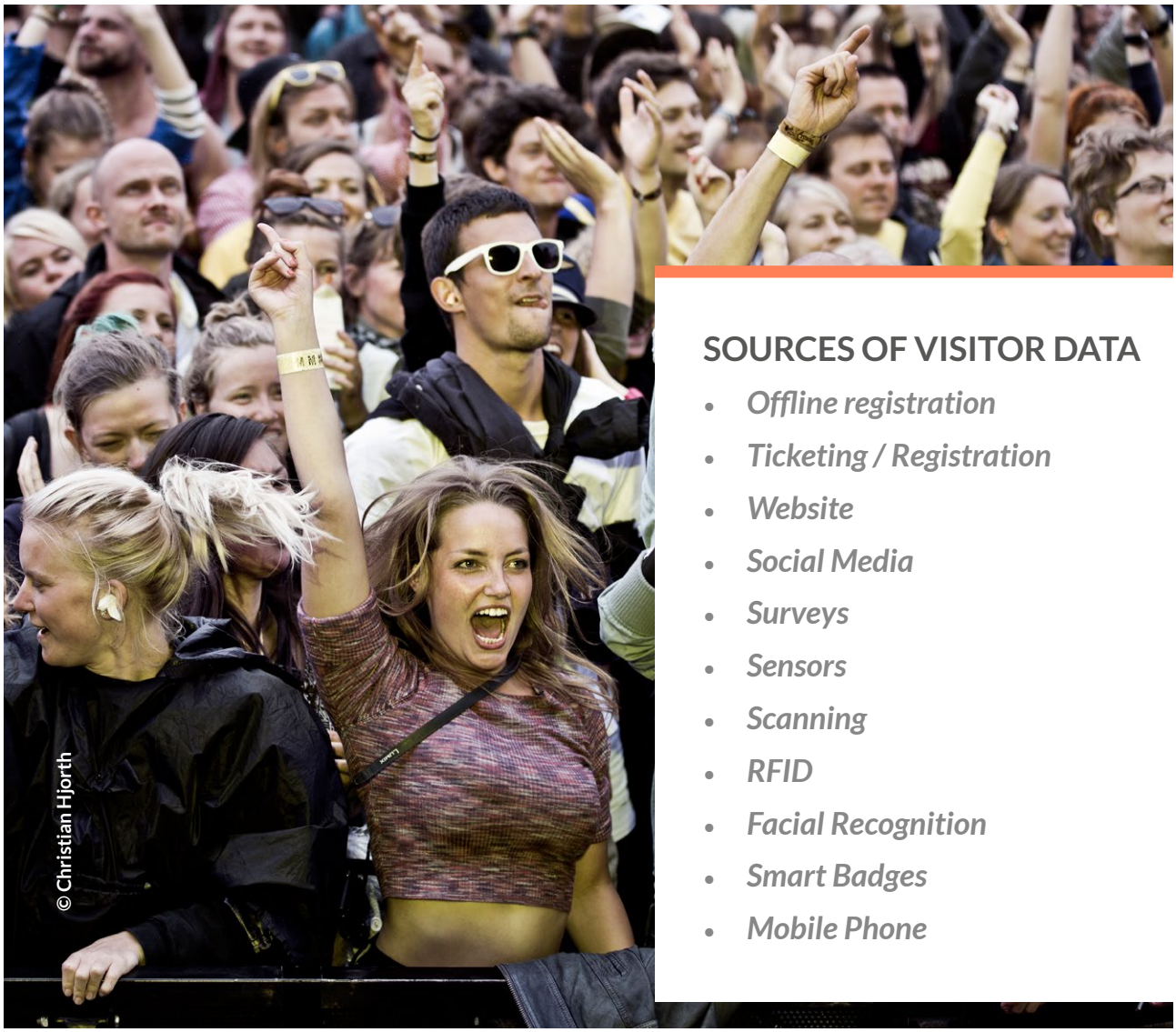
2.3 Alternatives to mobile app sourced visitor data

As we've just highlighted, visitor data has multiple possible sources. Your mobile app is just one. For completeness, here is a quick overview of other sources of visitor data, using the 'who-where/when-what-why' categorisation we set out in the previous section.

Demographic data (the "who") can be sourced offline as well as online, from registration, ticketing and surveys. This data may already reside in whole or in part, in a system somewhere (in last year's event registration database, in a social media service, etc) so rekeying the data may not be required if correct data protection permissions have been obtained.

Location data (the "where/when") can be sourced from installed infrastructure (sensors, wifi access points etc). For example, footfall sensors can be installed at entrances / exits to provide accurate direct people counts. But this is limited to the flow through the monitored entrance.

State-of-the-art techniques include thermal imaging, stereo and mono cameras, time of flight measurement or infra-red beams. More established methods for getting counts include using RFID, or otherwise scanning badges/tickets (using barcodes), or simply someone with a clicker tallying people as they funnel through an entry/exit zone.



SOURCES OF VISITOR DATA

- *Offline registration*
- *Ticketing / Registration*
- *Website*
- *Social Media*
- *Surveys*
- *Sensors*
- *Scanning*
- *RFID*
- *Facial Recognition*
- *Smart Badges*
- *Mobile Phone*

These techniques count footfall rather than track people. That is an important distinction. They can provide limited footfall information for the premises but shed little or no light on customer behaviour. CCTV incorporating people counting software can also be used, and to an extent this can track individual paths. But cameras are expensive, and installation is often a challenge. Each camera only covers a small zone, and

systems can't always stitch together the customer journey.

Even more advanced systems use facial recognition. As these systems develop, it may be possible to easily track an individual journey across many cameras, and across large sites. It could even be possible to identify the individuals, if visitors have provided photographs during the registration process (and have also consented to such use of these photographs).

Rather than just counting visitors, attendee tracking techniques can also provide information about visitor behaviour (the "what"). They enable you to assess traffic patterns, differentiate new from recurring visitors, trace paths through a location, record dwell time, and so on.

Tracking attendees from devices they carry isn't limited to their mobile phones. Issuing attendees with a smart badge (effectively a transmitter) and installing appropriate sensors at key locations around the event environment is one proven route, albeit a relatively expensive one.

Similarly, tracking customer mobile phones without using an app requires infrastructure to determine the location of customer phones. Bluetooth is sometimes used, but very often it's WiFi based.

Most mobiles these days will have WiFi on. Periodically phones send out a 'ping' looking for nearby access points. These pings can be used to track phones, without them having to log into the WiFi network. There is also no requirement for the phones

to run any special software or app, or for users to give any permission.

With just one sensor, this is counting rather than tracking. But with more than one sensor, 'visits' to the different locations of interest can be associated with an individual, so limited customer behaviour can be tracked.

Where data is gathered across installed WiFi infrastructure, then actual locations can be tracked. Accuracy is a function of the infrastructure – how many access points are installed, and whether they're capable of the very latest (and expensive) positioning techniques, such as angle of arrival.

With both single sensors and infrastructure sensing, the frequency of data gathered is very variable. For phones that aren't associated with access points, there may only be a 'ping' every five minutes – which severely limits the value of the data.

Privacy concerns also have had a major impact on WiFi tracking techniques.

For devices that are associated with access points, location is possible whenever data is being sent over the connection. This again is hugely variable. Hence some WiFi access point manufacturers recommend that a mobile app is deployed, which sends small packets of data to a server to enable continual location data to be gathered.

Privacy concerns also have had a major impact on WiFi tracking techniques.

All of this leads to big questions over the actual usefulness of the customer tracking data that such WiFi tracking can provide.

Finally, as we have already stated, psychographic data (the "why") requires surveys or other feedback mechanics.

	WHO	WHERE / WHEN	WHAT	WHY
Registration / Ticketing	✓	✗	✗	✗
Website	✓	✗	✓	✗
Email	✓	✗	✗	✗
Social Media	MAYBE	✗	✗	✗
Surveys	✓	MAYBE	MAYBE	✓
Sensors	✗	✓	MAYBE	✗
Scanning	✗	MAYBE	✓	✗
RFID	✗	✓	MAYBE	✗
Facial Recognition	✗	✓	MAYBE	✗
Smart Badge	✓	✓	MAYBE	✗
Mobile Phone (no app, e.g. Wifi)	✗	✓	✗	✗
Mobile App	✓	✓	✓	MAYBE

Fig 2.3b Mapping visitor data touchppoints

Unlike data gathered at registration, post-event surveys provide the mechanic to collect data about attendee behaviour at the event. Or brand-recall for major sponsors can be tested.

Post-event surveys should be conducted as soon as possible after an event in order to ensure good recall. That often means surveying visitors as they leave.

Surveys can be conducted using paper forms using a team to question departing visitors. But post-event surveys can also be conducted digitally. That might be by email, but also face to face (using tablets) or using kiosks.

Post-event surveys should be conducted as soon as possible after an event in order to ensure good recall. That often means surveying visitors as they leave.

There are some advantages of face-to-face questioning. It's possible to deliberately target visitors in order to ensure particular groups are represented. And good questioners can probe visitors for more in-depth information when relevant. They can properly interview visitors, rather than just survey them.

But the cost effectiveness of online surveys make them the default option in most circumstances. See also section 3.5 regards location-based surveying.

2.4 Getting set 1: The importance of stakeholder consultation

Before commissioning your app, we'd strongly recommend consulting all stakeholders to compile and prioritise which data is most valuable to the specifics of your business. During this consultation phase you want to be considering your objectives and ensuring, to the extent it is economically viable, that you have the right data tools in place. That is both for the collection of the data and for turning the data into insight (covered in more detail in section 4).

For example, ask questions about what particular business challenges are you wanting to address. Specifically: "Which datapoints do we need to help us achieve each of these?"

Often the person commissioning the mobile app is not necessarily a data expert. But they don't necessarily need to be – just that someone in the organisation should be given this responsibility. Asking these questions too late – for example post event – and you'll probably find you don't have the data you require, and there won't be an easy way to get it.

You may want to follow a proven approach and write up problem statements following a template: what are you trying to achieve, what the current state is, how the business will benefit from any change, and what potential solutions might be.

Here are three illustrations we commonly encounter, from the most simple through to the more sophisticated:

- We want to understand which pages in the mobile app were most used (and when) so that we can enhance the value of the app for next year based on this data. This will result in an app which has more value to our visitors, which in turn we believe will generate more app interactions and generate more data that we can use to drive better decisions. We should ensure that we can get this data in a digestible form, from our developer's standard app analytics package.

Ask questions about what particular business challenges are you wanting to address. Specifically: "Which datapoints do we need to help us achieve each of these?"

- We want to understand which facilities around our event site were the most and least popular (we currently lack quantification of such consumption patterns), and ideally why. We can use this to better plan the next iteration of the event, including potential changes to the site plan which might save us money. We can get this data from measuring footfall to different locations around the event, using the mobile app to sample the entire audience.
- We want to understand the pattern of visits, repeat visits and dwell times at specific commercial partner locations around our venue. We also want to know whether visitors are positively influenced by branded push messages we will be

sending designed to drive footfall to these partner locations. We haven't previously measured any of this, but we need it to arm our sponsorship sales team with the data to help generate more revenue. Adding location tracking to our mobile app would enable us to do this.

You'll want to be considering carefully ROI here – the business case behind each, balancing cost versus benefit.

2.5 Getting set 2: GDPR

Whatever data you collect, you will need to ensure your business is compliant with applicable data regulations. That compliance requirement extends to any suppliers, such as your mobile app provider. Again, this is something that should be tackled up front, from the outset.

In Europe, the most talked about of these is the harmonised approach to privacy and data protection under the General Data Protection Regulation (GDPR) which came into force in 2018.

GDPR has principles around the collection and use of certain data, aiming primarily to give control to individuals over their personal data. Under GDPR business processes that handle personal data must be designed and built with consideration of the principles and provide safeguards to protect data.

For a mobile app, the onboarding process (that is the initial set of screens the app user is taken through when opening the app for the first time) is crucial in relation to GDPR. This is where the user will be asked to provide explicit, informed consent to whatever data is to be collected.

No personal data may be collected and processed unless there is a lawful basis for so doing, which normally means the user has individually given unambiguous consent (i.e. opted in). And the person must be able to freely opt out at any future point. The opt-in must have been explicit for the data to be collected and each purpose the data is to be used for.

So, what constitutes 'personal data' under GDPR? It can be can anything from a name, a home address, a photo, an email address, bank details, posts on social networking websites. Even location data or a computer IP address.

You should expect your selected mobile app developer to advise you on best practice in terms of design and wording for these all-important onboarding screens. This is particularly the case if you are seeking to maximise opt-ins legitimately for certain types of data services, including location and push messaging,

Under GDPR, no personal data may be collected and processed unless there is a lawful basis for so doing.

More generally, you'll want to be satisfied that any mobile app developer you select as your provider is fully GDPR compliant, including in relation to data security. How is the data handled? Where is it stored? Who has access to it?

You will require them to give you the appropriate legally-binding undertakings in respect of themselves as well as for any third-party integrations (sometimes called plugins) their app framework includes, such as analytics or location tracking.

This should all be covered by a Data Processing Agreement entered into between your business (normally acting as the data controller) and the app developer (normally acting as the data processor).

Finally, you'll want to ensure that your app has a clearly worded user-facing privacy policy, just as your website does. The policy will explain, at a minimum, what information is collected, how that information is used and why, who the data is shared with and why, the user's choices and rights, how the user's information is safeguarded, and how the user can contact you.

Regulation is an important but complex topic. Providing further detail is beyond the scope of this whitepaper. The above discussion does not constitute legal advice and you are strongly recommended to seek your own independent professional counsel in relation to privacy and data protection.

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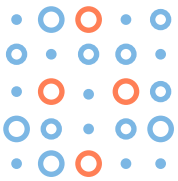


3: What are the different types of data your app can provide?

In chapter 2 we looked at how we might categorise the types of data that can be collected on visitors and how it might be sourced. In this chapter we look in more detail at the data you might source specifically from your mobile app. We start by examining the data that can be provided on app usage before considering other types of data.

3.1 App usage: basic performance indicators

If you operate a website, you'd want to know some basic performance metrics – like how many unique users each day/month or how many pages were viewed and which were the most popular.

The same goes for a mobile app. You'll want to understand how people are actually using your app. Not just which parts of the app, but also when and even where they are using it.

Even the most basic event app should come with some level of analytics. At a rudimentary level this might include counts of:

- Downloads (by platform i.e. iOS, Android)
- Active users – how many individuals used your app
- New users versus returning users
- Active sessions – how many user sessions were generated (a user being able a generate multiple sessions by opening/closing the app)
- Most popular pages browsed within the app
- Average time spent per user or per session or per page

And at a more advanced level:

- Country of origin (usually captured by the phone's operating system)
- Location (where the app was first/last opened)
- Device model and device specific measurements (e.g. battery percentage remaining).

Stepping up further, in-app analytics should help you answer questions like: How engaged are your users with your app (e.g. via app session interval, measuring measures how frequently your users return to your app)? What is the typical user journey around the app? Is there a particular exit point from the app?

In-app analytics should help you answer questions like: How engaged are your users with your app What is the typical user journey around the app?

Analytics packages like the popular Google Analytics for Mobile Apps enable you to measure what actions your users are taking or to visualize user navigation paths.

Push messaging is another function you'll likely want reporting on. You should be able to get reports on your campaigns such as:

- Number of app users who opted into push messaging
- Number of messages sent (total, individual message)
- Number of messages opened/read

3.2 App usage: advanced metrics

We'll ignore:

- App performance metrics, diagnostics and app stability reporting (e.g. tracking how frequently an app crashes or generates an error)
- A/B testing (for measuring which variant of app functionality performs best with users)
- Generic advanced analytics solutions (such as recording and replay of actual app usage, useful for identifying problems in UX design, onboarding or payment funnels)
- Data sourced from the phone's sensors such as the accelerometer, gyroscope, magnetometer and pedometer (with the exception of location data which is covered in sections 3.4 and 3.5 below), and
- Metrics tracking app user acquisition and app store ranking

as being out of scope. But if you are procuring your app from a reputable app developer they should be able to advise on all these and more. Your developer may already use advanced mobile analytics software such as from Mixpanel and Flurry. The latter also support tailored push notifications.

Instead we'll focus on functionality a typical event app will likely include specific to the underlying event, such as a browsable and searchable digital agenda.

We all know that a paper programme is out of date the instant it's sent to the printer. With an event app, you should never be in that situation.

The digital agenda is a universal feature of event apps. It might be a list of seminars with start times at a corporate event, a catalogue of exhibitors at an expo, or bands playing on stages at a music festival. In essence, a digital agenda provides information about everything taking place at the event and its schedule. Collectively we'll label these as "agenda touchpoints".

For some events the agenda may take the form of a meeting scheduler, giving your attendees an easy tool for booking appointments and building their agenda prior to arrival.

The digital agenda is a universal feature of event apps. For some events the agenda may take the form of a meeting scheduler.

In each case, it is possible to obtain reporting on which of these agenda touchpoints were bookmarked or favourited, and how many times, providing indicators of attendee intent.

Other event-specific functionality is likely to come with some level of analytics. Here is a selection of popular functions which might feature in an event app, with example associated analytics:

- **Interactive mapping / floorplans** – popular marked places using drop pin functionality.
- **Wayfinding/Navigation** – which routes are requested around your event environment. Increasingly this may use augmented reality (AR).

- **Downloadable resource documents** – number of downloads.
- **Alerts** – see push messaging in section 3.1 above. Alerts can also be delivered as in-app notifications.

The overarching theme here is that any in-app functionality can be measured, at a minimum in terms of how frequently users interact with it – providing analysis of which elements of the app are most valued by visitors (or conversely which functionality is potentially superfluous). This data can be used to inform the future evolution of your app.

3.3 Attendee demographics

There are a number of ways of your mobile app can help you capture rich data on who your attendees are. We consider a few of them here.

Many event apps come with social media linking. This takes a number of guises, but typically embeds some element of functionality from popular social media services into the event app experience.

At its most basic it might enable app users to 'check in' via their personal social network by connecting the app to a social media login (e.g. Facebook, LinkedIn) – to find friends at the event, for example. This function is normally optional, on the basis that the app user should decide whether he/she wants to link the app to their social media account, and because not every user will have a social media account.

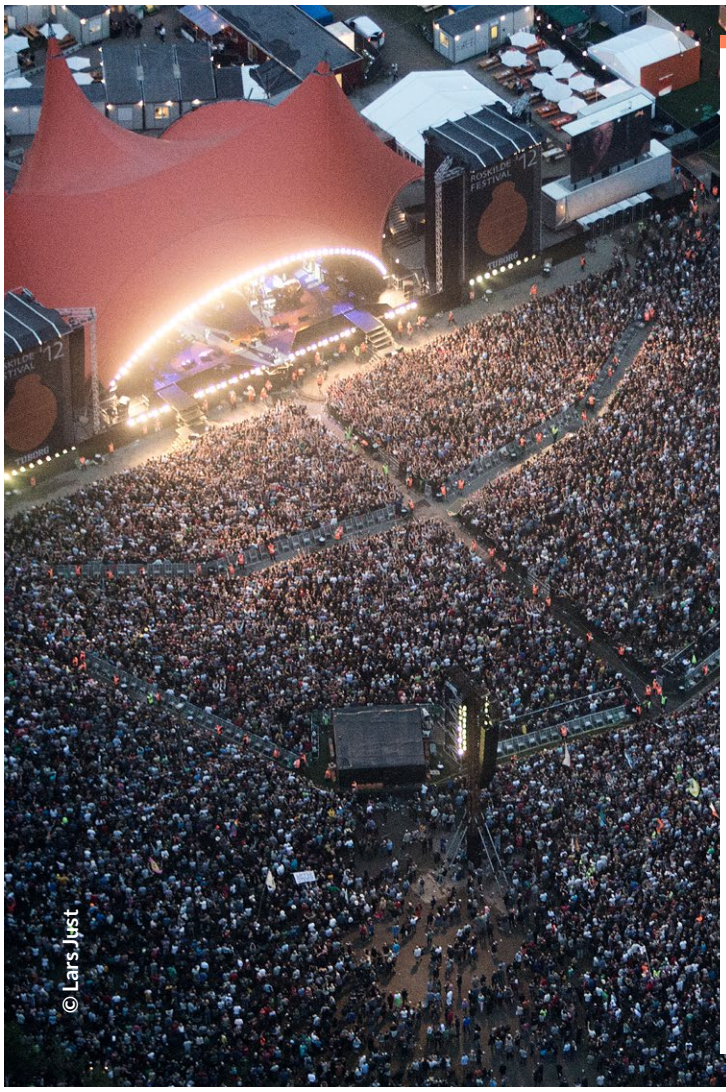
Additional functionality might be based around sharing material – for example an interactive social feed within the app, allowing upload of user generated content such as photos or video, or the automated creation of a digital logbook or scrapbook, using combining location data from the user's journey around the event with agenda touchpoints. This last-named type of feature is offered by developers of music festival apps, for example.

There are a number of ways of your mobile app can help you capture rich data on who your attendees are.

As well as providing a valued user-facing functionality, this also benefits event organisers by providing a level of registration data capture (e.g. name, age band, gender, email address, etc.) integrated into the app without necessarily requesting users embark on a full registration process (which might be deemed too intrusive). For events without a formal registration process, this can be effective route to de-anonymising app users.

Other in-app functionality that can provide a mechanic for capturing user demographic data includes:

- **Networking** – allowing the app user to connect with other attendees on a one-to-one basis to facilitate meetings, which enables organisers to map attendee connections. This functionality is often integrated from third-party solutions such as Grip.
- **Interactive audience engagement** – examples include surveys, polls, quizzes, question posting. These in-app feedback touchpoints can also contribute to understanding your audience's needs and the impact of component elements of your event. This type of real-time feedback can be used to fix problems, and modify schedules on the fly, rather than just using data to improve next year's event. Again this functionality is often integrated from third-party solutions such as Glisser, Sildo or Vevox/Meetoo.
- **Gamification** – participation in integrated games and quizzes, for example prize draws, and competitions. Can be linked to location data when taking the form of a treasure hunt style game.



Event App Functionality

- *Ticketing / Registration*
- *Digital agenda*
- *Venue plan / map*
- *Wayfinding / navigation*
- *Social media linking*
- *Networking*
- *Audience engagement*
- *Alerting*
- *Gamification*
- *Badge Scanning*
- *Merchandising*
- *Food/beverage ordering*
- *Live streaming*
- *Proximity marketing*
- *Surveys*

- **Badge scanning** – integrated QR code scanner for session check-in or lead retrieval.
- **Merchandising** and in-app food/beverage ordering – ecommerce transactions.
- **Live streaming** – for example, using CrowdCast or the brand-new LinkedIn Live. Or for music festival apps, incorporating a service such as Spotify.

3.4 Footfall analytics via location tracking

The previous section highlighted various in-app functionality that actively delivers visitor data, particularly focused on demographics. But your mobile app can also passively collect data, independent of the user's in-app interactions.

The most obvious example of this type of data collection is location tracking. Organisers of large-scale events increasingly use location tracking for a number of reasons. Examples include:

- Evaluating site layout versus visitor movement (for future event iterations)
- Profiling attendees based on which elements of the show are visited and associated dwell time
- Measuring the footfall to sponsor activations
- Tackling queues and generally optimising service delivery
- Influencing visitor behaviour based on where people have/haven't been
- Crowd safety

Location tracking is complex and comes in various guises. App developers often outsource it to specialist providers (such as Crowd Connected), integrating the capability via a code plug-in to their app framework.

A word of caution here: not all location data is created equally. Some services only track the app user's location when the app is in the foreground (i.e. the app is on screen on the phone being actively used). Some only record the location of the phone when it is in the close vicinity of special hardware like WiFi access points or Bluetooth

beacons deployed around the event environment (and by definition do not record locations when the app user is out of range). Both these deliver data that is patchy and/or lacks granularity or is inaccurate.

The best location data is reliably persistent (i.e. the tracking service is 'always on' even when the app is not being actively used) and granular (i.e. updates are recorded at the required combination of frequency and accuracy).

The best location data is reliably persistent (i.e. the tracking service is 'always on' even when the app is not being actively used) and granular (i.e. updates are recorded at the required combination of frequency and accuracy).

Services specifically developed for the events market, such as Crowd Connected's Colocator, also combine footfall analytics and visitor engagement in a single platform. These provide the tools to:

- track mobile app users persistently in the background,
- process and visualise consistent high-quality data, at scale and in real time, and
- influence audience behaviour through location-based push messaging (see section 3.5 below).

Such services use multiple techniques to accurately and reliably position mobile phones, including GPS, WiFi and Bluetooth – even measuring signal strengths between phones.

To collect location data from your mobile app, users will need to give express consent via an opt in to location services. As discussed in section 2.5 above, this is normally achieved via the onboarding screens, and you'll want to ensure that you are maximising opt-ins by being clear on the benefits to the user of doing so.

For example, if the location data is going to be used to improve event safety (by enabling your operations team to monitor overall crowd movement thus giving them additional situational awareness) this could be called out. If location services opt in is required for location-based messaging, again this should be articulated clearly during onboarding. App users fear of missing out ("FOMO") can be persuasive here.

Typically, the location data gathered from app users is aggregated and can be visualised in a series of easy-to-digest graphical representations such as heatmaps, charts and tables. This is a crucial step that turns the stream of location data into something that can readily be accessed by an event management team to drive business decisions, either during the event itself or afterwards in a review phase.

You should also note that device counting (as in app users) is not the same as people counting. Tracking mobile phones via the official app will give you data on 100% of your attendees. Instead it is a sampling method – albeit an efficient and cost-effective one. A method is therefore needed to reliably scale from device numbers to people numbers. For many events this is straightforward: a count of both (i) the number of people running the app and providing location data from the event venue and (ii) the total number of attendees should be readily available. The ratio of (i) to (ii) gives the scaling factor.

3.5 Location-based push messaging

One well established use of mobile app sourced location data by events is to use it to build audience segments for targeted push messaging (sometimes referred to as "proximity marketing").

Simple location-based messaging solution enables a push message to be sent to a user with your mobile app when that app is detected as entering or exiting a defined area. Hence the proximity labelling.

More sophisticated location-based push messaging services enable audience segments to be constructed using combinations of location and time, for example to app users who were in location A at 10am this morning but who have not visited location B by 5pm that same day.

Simple location-based messaging solution enables a push notification message to be sent to a user with your mobile app when that app is detected as entering or exiting a defined area.

Services such as Crowd Connected even measure the effectiveness of targeted messages: did a message recommending a visit to a certain area have a positive impact?

Another use of location-based messaging is to trigger in-the-moment surveys. For example, on exiting a sponsor partner's onsite activation, a message can be triggered requesting the visitor rate their experience. Or seeing permission to recontact the attendee for a longer-form survey.

How to turn data into actionable insight

In this chapter we will look at stitching it all together and how to turn data into action: mapping data sets to segment your audience and better understand attendee behaviour. We will also consider which types of competencies you will need in house (or sourced externally) to benefit from the data.

4.1 From data to insight: what you need

Smart data should drive smarter decisions. But large pools of disparate visitor data can be a big headache without the proper approach to understand it. You need to turn raw information into business intelligence as a foundation for solid decision making.

But that doesn't mean getting caught up in the hype of Artificial Intelligence or Machine Learning. Instead, we'd recommend from the outset you simply have clear objectives in terms of what you are trying to achieve.

A couple of good questions to ask yourself (and other stakeholders) might be:

- Is it important that we understand visitor data at an aggregate level or at an individual level?
- Do we need the individual visitor to be identified within the data analysis we intend to have post event?

Let's assume you were collecting location data via your mobile app without any registration on the app (nor the app knowing the user from registration on your website because this data wasn't being pushed/pulled to the app). In this instance you will have a location trail for visitors who are not identified.

This location data is not strictly anonymous (in a legal sense, at least), because even if the visitor hasn't been identified, the person could be from their location data pattern. But we'll use the term 'anonymous' to mean data about an individual visitor's journey, when we don't immediately know the name or identity of the visitor.

Anonymous data works fine for aggregated statistics about an event. How busy was each session? What were the peak times for arrival? You don't need to identify individuals for this.

Anonymous data can also be used for personalisation and segmentation, but only in limited ways. As an example, you can send a targeted push notification to an app user, without knowing who they are. So, send a message to all those who have been on site for four hours but not yet visited location the main sponsor activation.

But if you want to send an email to visitors that had a certain pattern of session attendance, anonymous data won't work. You need a way to identify the individual from the data. Which means some form of registration or similar data capture – and marrying this registration (demographic, the "who") data with the location data.

You'll then want to be satisfied that the right resources (by which we mean systems, software and people) are in place so that you can realise these objectives. Broadly speaking these resources can be broken down as follows:

- **Data origination**. Where the data is coming from, and what type of data it is. Your mobile app, for starters. But maybe you want to combine that data with say registration data from your website, or demographic data you hold in your ticketing database or other CRM system.
- **Data storage and processing tools.** Securely storing the data in a format that allows for subsequent access. In essence, a database. This might extend to data mapping tools – collecting, integrating and preparing data from multiple sources, if required. Consider whether you will need this: integrating data captured from attendees' digital and physical footprints, for example.
- **Data reporting tools.** Going from data to insight. This could include visualisation tools that turn the data into charts, graphs or heatmaps. It might mean being able to readily feed the data into your own business intelligence (BI) tools/processes.
- **Relevant data analytics expertise.** Either in house or contracted in from a trusted supplier, to get the most from these tools.

The last of these, data analytics, is sometimes referred to as business analytics. This is the process of examining data sets in order to draw conclusions. What you want here is actionable information about key performance indicators.

Why would you do this? The answer is any of the following:

- To increase revenues
- To improve operational efficiency
- To optimise marketing campaigns
- To enhance customer service
- To respond more quickly to emerging trends
- To gain a competitive edge over rivals.

If you are clear on what you are trying to achieve and the resources you might need, what's likely to stop you from gaining valuable insight from the data you can collect?

First, you simply don't have enough data to draw meaningful conclusions from. If you haven't promoted your app to your audience or the app isn't well used, that is a risk. Particularly when you want to look at behaviour of your visitors, in aggregate or in segments. So, putting maximum effort into making the app prized by your visitors – in business jargon ensuring it has 'utility value' to the user – is critical. Then marketing the app to your visitors in relevant communications pre-visit is self-evidently also very important.

As we noted in section 2.1, you are asking your visitors to enter into a trade – their data exchanged for a fantastic app that elevates their experience of your event or venue to a new level.

Maybe your event is a ticketed one. In which case embedding the ticket into your app is one way to get great app penetration. There are plenty of other ways your app can deliver value to your visitors and we covered a good selection of these in chapter 3.

If you want to send an email to visitors that had a certain pattern of session attendance, anonymous data won't work. You need a way to identify the individual from the data.

What else might stop you from translating the data you collect into valuable insight?

One thing to avoid is trying to do too much – don't try to boil the oceans, as the saying goes. Focus on quick, valuable insights. Don't necessarily shoot for everything, particularly first time around.

Where possible also avoid manual processes that take time, are difficult and/or costly. Which means making sure that you have the rights software tools in place. Ask up front of your app developer or digital solutions supplier if the proposed solution is an end-to-end one. Or if you will require additional bolt-ons to turn data into insight. No good collecting reams of data if you then cannot use it.

4.2 Integrating visitor data from multiple sources

Let's now consider in further detail the specific challenge of taking different sources of visitor data and combining them to maximise the level of insight.

This could be integrating data captured from attendees' different digital activities (think website, mobile app, social media), perhaps also extending to the data gleaned from those same attendee's physical footprints (their interaction with your event environment).

The most common example of this data mapping is to de-anonymise the data collected via your mobile app by marrying it up with demographic data you might have on those individuals – in other words identifying the person to whom the otherwise anonymous app-sourced data relates.

Here you need to create a link between the mobile app and the demographic data held on a separate system (for example, your registration database).

There are a number of ways of doing this, but all rely on each app install being identifiable as such via a unique ID. Here are some examples:

- Single-sign-on between your registration or ticketing database and your mobile app.
- Issuing a unique token or code which users input into the app during onboarding.
- Linking your mobile app to a social media account (e.g.

Facebook, LinkedIn) which can then pull in the user's email address which can be stored by the app.

Once the link is created, any data captured by the app can be mapped to the individual.

For example, assume your mobile app also enables location data to be collected from visitors as the move around your event. This location data, anonymous by default and design, can be de-anonymised by mapping via the unique ID of the app install to demographic data.

How attendees interacted with different elements of your event can now be analysed against their demographic or other data.

So, how attendees interacted with different elements of your event can now be analysed against their demographic or other data (e.g. personal interests and preferences) that you might hold. As we shall see in the next section, this provides the basis for visitor profiling.

4.3 Your visitors: attendee profiling

You don't necessarily need to link otherwise disparate data sets to profile your visitors. But to get a deeper understanding of which visitors are your most valuable ones – perhaps because you want to attract more of this type of visitor – it may make sense to do so.

Below are a few examples of the sort of metrics you might consider important to have insight into as part of any profiling work (also known as segmentation) you can do, via visitor data analysis. Segments can range from the simple (e.g. male versus female or old versus young) to complex (e.g. how did day one visitors differ from day three visitors?). For each you will be looking for patterns or trends.

- Where do your visitors come from? Is there a dominant source? What proportion are new visitors and what proportion are returning visitors? This might help you hone future marketing activity.
- Which sorts of visitor spend more time at your venue? Which arrive early and stay late? Which visitors consume more of what you put on, or exhibit increased dwell times at certain elements of your offering? This might indicate a deeper level of engagement, and therefore visitors of higher value.
- Do your visitors also display patterns of behaviour in terms of what other locations they also visit in the nearby vicinity of your event? This might lead you to form partnerships with, for example, local hotels, restaurants or other businesses.

- How do your visitors get to your event – is there a preferred form of transport? Are there particular challenges in getting to/from your event?

Which sorts of visitor spend more time at your venue? Which arrive early and stay late? Which visitors consume more of what you put on, or exhibit increased dwell times at certain elements of your offering?

- How much do your visitors on average spend at your event? Does a certain segment of visitor spend more? This data could be valuable in negotiating with food and beverage vendors or others concession holders.
- If your app enables visitors to set up their own personalised schedules by 'favouriting' certain elements of your event, do these visitors actually stick to those schedules? Or do they get distracted and, in reality, deviate significantly from the pre-planned schedules when at your event? This may give you insight into the overall event experience for your visitors.

4.4 Your venue/site: facility utilisation

You can also use the visitor data you collect to get a better understanding of how well your venue layout works, based on metrics of how attendees interact with the facilities and content you provide.

This exercise is particularly valuable for organisations that host recurring events on the same site and have a degree of control over the layout of that site (as well as the lead time to effect changes, where practical). A good example might be an annual music festival in a greenfield location.

Evaluating the layout through visitor movement can provide crucial insight which can inform planning future event iterations. Perhaps changes to your site plan could influence future visitor behaviour.

Here are some sample questions you might want answers to:

- Which areas were highly trafficked and which areas conversely attracted fewer visitors than expected? Could parts of the event be better signposted?
- Where were the worst queues and what could we do to alleviate these to optimise service delivery?
- Were there any pinch points in terms of visitors moving around the venue?
- Do we need to consider moving certain elements to different positions to 'load balance' facility utilisation or to attract visitors to certain locations (to encourage discovery)?

For many events, an important source of revenue is from commercial partners who have a physical presence on site – food and beverage

Frequently event organisers may believe they have a good handle on this through eyes and ears on the ground. But there is always the risk that disproportionate weight is given to subjective views of a few individuals. Analysis of visitor data can provide an objective and quantitative measurement. And it also might provide important insight into issues that would otherwise not necessarily be visible.

Event organisers may believe they have a good handle on commercial partnership activities on site through eyes and ears on the ground. But analysis of visitor data can provide an objective and quantitative measurement.

Measuring the footfall to sponsor activations, and then profiling this subset of visitors, can strengthen commercial partnerships.

For many events, it is no longer good enough just to send a post-event report full of pictures of smiling people and a round-up of social media commentary. Sponsors increasingly demand quantitative evidence on how their activations performed. Event management teams need to be in a position to provide commercial partners with what they crave: robust, meaningful data. Or risk losing out on valuable revenue.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5: Example Use Cases

In this chapter we look at a variety of real-world examples of how visitor data sourced from mobile apps is being used to positively impact the event organiser business's bottom line – whether that is in underpinning revenue generation or in driving decisions that generate operational efficiencies.

5.1 Case Study A: The Music Festival

Music festivals have specific operational and commercial challenges. They are large-scale events that attract big crowds to temporary sites. But almost universally they provide a mobile app which a large proportion of festivalgoers download as it is an essential digital companion.

A good festival app is highly valued by festivalgoers who rely on it to provide an ever more immersive live experience. Before, during and after the event, the app has become so much more than just a schedule or a map. It's become a multi-functional personalised guide.

As we have seen, that's because apps are becoming smarter at delivering exactly the content festivalgoers need. At precisely the moment they need it. The focus is on enhancing their experience. That could be by surprising and delighting attendees into discovering things they were unaware of, or by delivering timely, contextual information as to what's going on.

As well as enabling targeted location-based communications, a large number of music festivals also use their app to provide critical real-time insight into crowd movement. This location data is also valuable for post-event reporting.

At Roskilde, the largest festival in Northern Europe, management have been using their mobile app in this way to monitor, measure and engage with festivalgoers for a number of years.

Roskilde's operations team use location tracking to get enhanced real-time situational awareness of festivalgoers' movement around

As well as enabling targeted location-based communications, a large number of music festivals also use their app to provide critical real-time insight into crowd movement.

the entire site. Heatmaps show relative crowd densities for any area – enabling a quick assessment of how busy any element of the festival is at any time. This complements established 'eyes and ears' on the ground such as CCTV and stewards/volunteers.

The operations team also create dashboards in a web console to provide real-time quantitative read-outs of metrics such as counts, flows and dwell times, for areas of the festival site they want to monitor, as well as off-site locations such as transport hubs and campsites.

As is typical with many festivals, the heatmaps and dashboards are

displayed in control rooms. If an incident occurs, the heatmap from the time/location can be replayed as part of any review process undertaken by festival management.

By tracking festivalgoer movement to, around and from the site, Roskilde's digital marketing team are able to send hyper-targeted push messages. Typically, festivals use these messages to communicate with attendees for:

- **Information** – practicalities and logistics
- **Recommendation** – aid discovery, drive footfall
- **Promotion** – new angles for commercial partners
- **Safety** – incident response, emergency messaging.
- **Feedback** – in-the-moment surveys

Post-festival the Roskilde management team are able to review reports that provide insight that can be fed into the planning of the site layout and operations for next year's edition.

Along with Roskilde, fellow Danish festivals Smukfest, Copenhell and Distortion have all used visitor tracking to enrich the customer experience, to monitor crowd movement and for post-event analysis.

5.2 Case Study B: The Exhibition

Most exhibition organisers scan visitors in and out. But what do visitors actually do in between? And, going one step further, how can organisers influence visitor journeys around their exhibition environment? How can this be done in real time?

Organisers of large-scale indoor events such as exhibitions, conventions, trade shows and congresses require reliable data on visitor movement. As we saw in section 2.3, there are a number of different ways of collecting visitor data. But using a mobile app enables both footfall analytics and visitor engagement to be successfully delivered – as the team behind the world's biggest education technology event, Bett, demonstrated.

Bett is a flagship show in ITE Group's global portfolio of trade exhibitions and conferences. Located in the UK at London's largest event space, ExCel, every January, and running over four days, Bett attracts more than 34,000 influential attendees and 850+ leading suppliers, making it the global meeting place for the education technology community. The 2019 edition of the show covers almost 44,000sqm of main floor area, plus additional off-floor meeting and presentation suite spaces.

Consistent with both parent ITE Group's vision and the technological nature of the event itself, the Bett management team sought to leverage the popularity of event's official mobile app to tackle a number of business challenges.

The Bett management wanted reliable quantification of visitor movement around the main show floor, for certain feature locations, as well as for several off-floor show areas – beyond scanning on entry to the show itself.

The Bett team wished to avoid the significant price-tag associated with a deployment of expensive sensors, particularly given the size and scale of the show. Instead, a full evaluation of a more affordable mobile-based solution appealed. This was especially the case given the high adoption of the Bett app among visitors, with investment already committed to increasing the utility of the app including, for example, the addition of matchmaking functionality.

The Bett management team wanted reliable quantification of visitor movement around the main show floor, for certain feature locations, as well as for several off-floor show areas.

Additionally, Bett management wanted to segment visitors in real time based on their journey patterns to/from/around the show floor. This would then enable targeted messages to be sent to tightly defined groups of visitors – for example to drive footfall to certain feature locations or to otherwise influence visitor journeys around the show environment.

It was recognised that this would help personalise the event experience for visitors through the mobile app, as well as providing additional digital inventory for headline sponsors in the form of branded push notifications.

Leveraging the popularity of the Bett mobile app, which achieved record downloads in 2019, Bett used Crowd Connected's Colocator technology to deliver accurate footfall tracking and personalised visitor engagement.

Through data visualisations and analytics specifically tailored for the indoor exhibition environment, the Bett management team benefited from enhanced behavioural data on the show's visitors. Outputs included:

- Offsite insight, for example on fringe events or app users who didn't visit the show.
- Onsite analytics, including show floor heat mapping for visitor flow management, attendance counts for selected areas and dwell times.
- Advanced visitor behavioural segmentation modelling / mapping.

Additionally, almost 8,000 targeted messages were delivered across multiple different segments using business rules. Reporting on the positive impact of this digital messaging on influencing visitor movement – for example to sponsor locations – was also provided.

5.3 Case Study C: The Sports Event

Smart sports businesses use data to drive better decisions. Increasingly sport – from football clubs to golf tournaments, cycling to motorsport – are taking full advantage of a ready-made tool, their mobile app, to provide them with data on their customers. Specifically, the customer segment who attend their sporting events.

They view mobile location data as the bridge between the physical and digital customer journey. Location-based insight is critical for better understanding fan behaviour, enhancing the match-day experience, for service optimisation, for elevating commercial partnerships and for addressing crowd safety.

In the UK, leading Premier League football club Tottenham Hotspur recently opened its state-of-the-art, multi-purpose stadium. The £1billion new home is the largest of any club in London. Alongside the impressive new stadium, the club completely overhauled its official mobile app, designed to provide an essential companion for fans going to the new stadium. A specific objective is to gather data to assist with fan mobility and fan engagement. So the new app includes location tracking on matchdays, alongside features such as the user's digital ticket which drive uptake.

Tottenham Hotspur's new stadium sees a significantly upgraded customer offering in terms of facilities and services that fans can consume. The club's management team are aware that the matchday experience for their customers is evolving. Increasing fans' dwell time pre- and post-match at the new stadium is critical to increasing on-site revenues from the wide variety of new food and beverage

outlets as well as from non-football entertainment attractions. There's a constant need to attract, retain and delight fans.

Location-based insight is critical for better understanding fan behaviour, enhancing the match-day experience, for service optimisation, for elevating commercial partnerships and for addressing crowd safety.

The club's management also face challenges in relation to getting fans to and away from the new stadium, particularly given the increased seating capacity. This is despite a reported £100million being spent on upgrading local infrastructure, including improvements to local railway station facilities.

By using matchday tracking, the club's management team benefit from:

- Insight into fan mobility in and around the new stadium
- Additional crowd safety through real-time awareness of crowd flows
- Data for modelling – understanding patterns of matchday fan behaviour
- Targeted communications to influence future dan behaviour to maximise engagement and consumption.

Tottenham Hotspur, like many sports businesses, recognise that they need to monitor, measure and engage with their matchday audience

into order to influence fan behaviour. To get fans to the stadium earlier, stay on longer after the match, do new things and spend more.

That means understanding the complete matchday fan journey, engaging with fans effectively and getting them to respond positively. Mobile app sourced data is critical to this.

5.4 Common Themes

There are a number of common themes that emerge from the three case studies in the preceding sections. We summarise these below.

From an attendee's perspective:

- Enhancing the experience through personalisation, in real time
  - Targeted messages to audience segments based on behaviour
  - Encouraging discovery
  - Load balancing / queue management

From the organiser's perspective:

- Better understand how visitors move around and how they rate their experience for operational planning / efficiencies
  - Where attendees spend most time: Ranking the popularity of the component elements of the event
  - Facility utilisation levels
  - Tackling bottlenecks and queues
  - Optimising staffing
  - Offsite versus onsite insight
  - Enhanced customer feedback through geo-targeted, in-the-moment micro surveys

- Enhancing crowd safety and security
  - Additional situational awareness
  - Enhanced targeting of communications in an incident response scenario

- Generating additional revenue
  - Enhanced reporting: footfall analytics for sponsors / brand partners
  - Additional segmented digital inventory for sponsors (i.e. geo-targeted push messaging)
  - Using targeted messaging to drive footfall to a sponsor's on-site activation

- Improved return on investment, measured through future iterations of the event
  - Better Net Promoter Score figures
  - Increased ticket sales / advance registrations
  - Word of mouth advocacy / social media commentary

6: Top Tips (Dos & Don'ts)

With the right tools, collecting and using visitor data from your mobile app can be simple and cost effective. Here's a summary of the key takeaway messages from this whitepaper.

1. **Do identify all stakeholders up front, and be clear on their objectives:** What visitor-related data does your business value and why? How is this data best sourced – is your mobile app the best option? How is this data going to be turned into insight which can drive decisions? Don't leave this until the app has been launched!
2. **Don't ignore the maxims "learn how to walk before you can run" and "stay focused"**. The volume of data generated at events can seem daunting. Start by doing as much as possible with a little bit of visitor data. This will likely deliver better results than doing a little with a lot of data. Monitor too much, and you'll end up spending less time on what matters.
3. **Do maximise the data collection you have identified as your priorities** by working closely with your app developer to get opt-ins where required, ensuring GDPR compliance (including getting the right permissions from your visitors for your proposed use of the data. Take the time to look at what you think is going to be important before developing the app. Target only the metrics you need to achieve your priority goals.
4. **Do check if you are buying an end-to-end software solution**, or whether there will be a requirement to integrate different

products or services (for example to undertake data analysis). This is important form a budgeting perspective, which neatly leads us onto our next point.

5. **Do consider whether you have the tools and skills required to turn visitor data into actionable insight.** If you don't have these resources within your organisation consider whether you need to contract this in as part of the solution. This could take the form of a consultancy, a managed service, or hiring a specialist data analyst on a short-term basis. It shouldn't necessarily translate into significant extra cost.
6. **Don't forget to set success criteria.** You'll want to be able to objectively review the value the visitor data is delivering to your business. You'll ned to judge return on your investment in collecting, processing and analysing visitor data. For example, does the data enable your business to generate more revenue (if so how much?) or to implement cost efficiencies in on-the-ground operations?

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