



Building a Data Engine for Construction

Qflow's digital data trail is cutting costs and reducing waste on construction sites

Executive Summary

As an extraordinarily complex and diverse sector, the construction industry has been slow to digitise. One enduring problem is an over-reliance on a paper trail to track the deliveries of materials and the disposal of waste, leading to major gaps and deficiencies in the data available to contractors and their customers.

To help construction projects improve quality control and reduce costs and greenhouse gas emissions, Qflow is capturing digital data on the materials that arrive at, and depart from, building sites. As many materials suppliers don't have sophisticated order management systems, Qflow decided the most straightforward approach would be to task on-site staff to take a photograph of each delivery note and upload it to a cloud-based system to be verified and analysed.

Over the past seven years, Qflow has used machine learning to continually improve the accuracy of this system to give its clients "a really rich, very detailed, picture of what was coming onto site and what was going off". Adopted by major businesses, such as Scottish

Power, and major public construction projects, such as the UK's HS2 rail link, Qflow has now captured more than 75,000 material and waste movements, resulting in an average savings of £221,000 per year per project, while avoiding the equivalent of 9,690 tonnes of CO2 in greenhouse gas emissions.

After expanding rapidly, even during weak years for the construction sector, Qflow is now serving more than 300 construction sites. It is aiming to become profitable within two years, while continuing to grow the business both in its home UK market and abroad. Qflow is now expanding into the US, Australia and continental Europe.

Qflow is also advancing its quality control proposition so that its system will be able to ingest a client's design specifications and then automatically create a set of quality rules that will govern when the Qflow system sends them an alert. To support the circular economy, it is exploring how its data can inform "building-scale material passports" that will document what could be reused in future. At the same time, Qflow is developing industry benchmarks that could help clients assess performance and manage materials more efficiently and effectively.

As well as helping to improve quality and reduce costs in construction, Qflow is delivering “sustainability by stealth” in a sector that consumes a major chunk of the world’s resources.

When it comes to digitisation, the construction sector is lagging behind many other industries. But there are good reasons for that.

Firstly, every site is unique, meaning every construction project is different. Secondly, building contractors, and the suppliers they rely on, are highly fragmented, diverse and dynamic – new supply chains form for each project depending on the location and the nature of the construction. Finally, in the highly competitive building industry, margins tend to be very low, leaving little headroom for contractors to invest in digital solutions.

Given these distinctive challenges, it can be difficult for tech players to effectively meet the needs of the construction sector. Enter Brittany Harris and Jade Cohen, who both have a background in the industry and understand the obstacles it faces. In 2018, they co-founded Qflow to harness digital technologies to forward their passion for making construction more sustainable.

“When we first started looking at this, we looked very broadly and what we found was that materials and waste was not only the most consistently problematic, the most ubiquitous problem for the industry, it also had the biggest, most unseen footprint,” recalls Brittany Harris. The construction industry consumes about 40 percent of the world’s raw resources, according to The World Green

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Brittany Harris - Co-founded Qflow

Building Council, and contributes roughly 40% of the waste that goes to landfill. As construction materials criss-cross the world to be refined and then deployed, the sector is also a major contributor to greenhouse gas emissions – representing 11% of the overall total.

People, of course, need buildings, but there is scope to significantly reduce the environmental impact of construction. “We started unpicking the fact that there is not only this colossal footprint, but a huge portion of it is pure unnecessary waste just through mismanagement of materials,” says Brittany Harris, noting contractors frequently must reorder or replace materials due to the errors that occur through largely manual processes.

It started with sustainable timber

After brainstorming how to reduce this footprint with their contacts in the construction sector, Brittany Harris and Jade Cohen were asked by London-based developer Canary Wharf to take a look at a particular challenge it was facing. The developer had set some very specific sustainability objectives for its Wood Wharf development in London’s docklands - it was trying to use only responsibly-sourced timber for the new buildings. But Canary Wharf couldn’t demonstrate it had achieved that goal without reliable information about its supplies.

Unfortunately, the paper delivery notes that accompanied timber deliveries would often go missing, meaning there was no way to be sure the wood had been responsibly sourced. As a result, the developer ordered some of the initial building work to be dismantled, increasing the overall environmental impact and costs, as well as introducing delays “just because you didn’t get the right information at the right time,” notes Brittany Harris.

Qflow set about trying to fix this problem. “Our first thought was to go to the supply chain,” she recalls. “They had about 12 different timber suppliers on this project. One of them, I remember was this little wood shop in Southall in West London, and it literally was





a bloke in a shed with loads of timber at the back using a A4 lined book as his order log, and the multi-coloured carbon copy pads for delivery slips”.

As such suppliers didn’t keep digital records, Qflow decided the best way to track the materials being used by construction projects was to capture this information at the point of delivery. “And the simplest way to do that is to take a photograph of a piece of paper – the delivery note,” explains Brittany Harris. “We got them to automatically send the photo to us. We would then digitize them manually, because there was no AI at this point”.

In a three-month pilot, Qflow says it captured multiple uncertified timber deliveries, saving the Wood Wharf project £160,000 just by preventing these materials from being installed on site. The next step was to find a way to automate this system.

Developing a data engine that improves over time

Using machine learning, Qflow developed a system that could read and analyse each delivery note. “And we were therefore able to roll it up across all material types and waste and get a really rich, very detailed, picture of what was coming onto site and what was going off,” says Brittany Harris. “It is kind of like a data engine on the construction site, and we feed into three core value cases. One is quality control: Is it the right type of material? One is cost control: Is it the right amount of material from the right suppliers and then the other is sustainability and carbon reporting”.

While the co-founders of Qflow are particularly passionate about sustainability, all three value cases are clearly important in an unstable world in which supply chains can be disrupted by wars and natural disasters and investors are jittery. “Internally, we have this little joke that we’re delivering sustainability by stealth; providing people a quality and finance system that really helps them capture the data that enable those core bottom line functions for them, while also tracking their impact and identifying opportunities to cut carbon!” notes Brittany Harris.

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For publicly-funded projects, a highly transparent data trail is particularly important. Before adopting Qflow, HS2, a major project to expand the UK’s high-speed rail network, was employing 12 people just to verify that the goods they had ordered had been received on site, Brittany Harris says. “The project team was really struggling, but after they deployed Qflow, they went from 60% coverage to over 90% coverage within three months. Now they have access to that data in real time, they’re able to hit their targets around paying their suppliers”.

Over the past seven years, the number of construction sites employing Qflow’s system has doubled each year – it is now in use across 300 sites. As a result, its AI models have been able to ingest more and more data and get better at digitising, auditing and structuring data. Today, the system is at 100% coverage and can now process all kinds of delivery notes. The vast majority of the process is automated, but Qflow still performs human checks. “Trust in technology is very fragile in construction,” explains Brittany Harris. “If the technology doesn’t perform, they will blacklist it and walk away, and we’ve seen this so many times, which is why we have a human team that quality assesses the data”. As a result, Qflow says its system now scores 95% plus in terms of “data quality, accuracy and completeness,” while a manual process typically scores 40%”.

As each construction site is different, Qflow has designed its system to be as flexible as possible. Now employing 50 people, Qflow has a growing customer support team that takes the time to understand clients’ needs, workflows and priorities. This team works with each client to help them in accessing the value of their data, taking a ‘teach a man to fish’ approach, helping to increase data literacy within their clients so that they can scale their impact.

While the logical next step might be to take photographs of the actual building materials, as well as the delivery notes, Qflow has explored this with clients and found that the consequent increase in friction in the delivery process is not worth the relatively modest value that data would bring. “As we develop Qflow we are always listening to what our clients tell us would be most valuable to them. It is then our job to figure out how we provide this with the minimum friction”, notes Brittany Harris. “If it’s not easy and enjoyable to use, people simply won’t adopt it, and the value is lost. That is why we are obsessive and keeping things simple and valuable. Less is more!”

To date, Qflow says its system has captured more than 75,000 material and waste movements, resulting in average savings of £221,000 per year per project, while avoiding the equivalent of 9,690 tonnes of CO2 in greenhouse gas emissions. Qflow is available as software-as-a-service with the cost of the subscription based on the size of the project.

Expanding the scope of the system

While Qflow targets construction projects with a budget of £40 million upwards, the system is also used for relatively small jobs, such as a fitting out individual floors of building. In such cases, the client buys a license to cover multiple projects. Although its system could, in theory, be used in many different sectors from mining to facilities management, Qflow doesn’t have any immediate plans to expand beyond construction, which is a massive industry.

Geographic expansion is a priority, however. To date, Qflow has primarily served the UK market, but it now has a foothold in the US and Australian markets and is beginning to expand into continental Europe.

From a product perspective, Qflow is focused on advancing its quality control proposition and exploring how its data can unlock new value, such as enabling a materials passport for each building that will document what could be reused in future.

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“That should start to unlock some of the things that Jade and I are really passionate about around the circular economy,” says Brittany Harris.

To improve quality control, the next generation of the Qflow system will be able to ingest the client’s design specifications and then automatically create a set of quality rules that will govern when the Qflow system sends them an alert. “It’s about providing more value, but also value that they may not even know that they’re missing out on,” explains Brittany Harris.

Qflow is also exploring the development of industry benchmarks that could help individual clients become more efficient and effective. “Everyone wants to know how they’re performing against each other,” notes Brittany Harris. “But this data can’t be used as a stick to beat the industry with, it needs to be used as something to lift everyone up with, and so we’re exploring how we create those anonymised benchmarks and insights, but without exposing them to potentially, quite unfair pressure, as well”.

To help it fulfil these ambitions, Qflow has just raised more capital, which will be used to grow to profitability within the next two years. Despite the volatility of the construction sector (2024 was a particularly weak year), Qflow continues to hire more staff and grow the business. At the end of 2024, it began working for Scottish Power, rolling out across 80 construction sites in just six weeks. “The team did a phenomenal job, but it certainly was a stretch to our capability and that’s one of the reasons that we’ve raised more capital; to increase our capacity to serve these mega clients,” says Brittany Harris. “We are a growing business, on top of having a laser focus on being profitable and impactful”.



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The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

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Qflow

Qflow is a construction technology company on a mission to build a world where construction work leaves a positive legacy. Founded in 2018 by Brittany Harris, a civil engineer, and Jade Cohen, an environmental scientist, Qflow was born from firsthand experience of the inefficiencies and environmental impact that plague construction sites.

Headquartered in London, Qflow empowers project teams with real-time data on materials, waste, utilities, and carbon, captured directly from site the moment it happens. By connecting what was planned with what arrives and is used on site, Qflow helps teams ensure quality, reduce risk, minimise waste, and avoid costly rework or delays.

Qflow gives the construction industry the tools it needs to truly understand what's going into the buildings we create — protecting the people who will use them, safeguarding the environment, and helping teams build better, faster, and more efficiently.

For more information, visit: www.qualisflow.com

About the GSMA Foundry

The GSMA Foundry is the go-to place for cross-industry collaboration and making positive change happen, supported by leading technology organisations and companies. By bringing together members and key industry players, engaging, and unifying the end-to-end connectivity ecosystem, the GSMA is solving real-world industry challenges.

Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. This enables the mobile industry's mission: to connect everyone and everything to a better future.

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