SCSP Innovation Fund Case Study
Hubble

Summary

This project implemented Hubble, an AI-powered tenant empowerment platform, to enhance the living experience for social housing residents. A core function of Hubble is aggregating diverse data sources, including housing management systems, neighbourhood data, and sensor data. Through partnering with Craigdale Housing Association and Alpaca Global Solutions (AGS), this aggregated data was used to create actionable insights for both tenants and Craigdale housing staff. Key achievements include high levels of tenant engagement with the platform, potential for improved maintenance request efficiency, and a 10% reduction of mould-reported issues in monitored homes. Key learnings highlighted the value of layered data analysis, tenant engagement, and data aggregation's power in addressing tenants' issues, including mould-related challenges. The project leveraged Glasgow's fast 5G mobile network to ensure seamless data transmission and access to the Hubble platform, which is crucial for real-time monitoring and intervention.

Watch the Hubble (Tenants Hub CIC) case study video.

Introduction

Context and Rationale (Problem Statement)

Social housing providers often struggle with budget constraints, inefficient processes, and a lack of data-driven decision-making. This is frequently due to data silos and an inability to aggregate information from various sources effectively. This leads to increased costs, reactive rather than proactive service delivery, and reduced tenant satisfaction. The sector's digital risk-averse nature compounds this. Hubble is being developed to address these challenges by providing a user-friendly platform aggregating data to empower tenants and provide housing providers with valuable insights. High-quality 5G mobile connectivity is essential for tenants and housing staff to access and utilise the Hubble platform effectively. Glasgow is well-served by a 5G network that offers strong signal strength and efficient data transfer, so we could use Unity's purpose-built 5G data hubs to transmit the data in real time.

Project Objectives

- Integrate diverse data sources into a single platform to create a unified view of tenant and property information.
- Develop AI-powered analytics to generate actionable insights from the aggregated data.
- Increase tenant engagement with services and improve satisfaction.
- Develop AI-powered analytics to identify mould risk factors.
- Enhance data-driven decision-making by housing providers by providing accessible and comprehensive data.

Background Statistics / Supporting Data

Health Impacts:

▸ Respiratory Problems: Mould is a known trigger for asthma and other respiratory conditions. Scotland has a high prevalence of asthma, with around 1 in 11 people affected.

▸ Vulnerable Populations: Children, the elderly, and those with pre-existing health conditions are particularly susceptible to mould's adverse health effects. Addressing mould is crucial in reducing health inequalities.

Housing Conditions:

▸ Scottish House Condition Survey (SHCS): This survey provides data on the prevalence of dampness and mould in Scottish homes. While most homes are free from these issues, a significant minority still experience them. The 2022 SHCS found that around 91% of all dwellings in Scotland were free from mould. This means that approximately 9% of homes still have issues with mould.

▸ Disrepair: The SHCS also highlights the issue of disrepair in homes, particularly critical elements like roofs and walls, which can lead to water ingress and mould growth. In 2022, 49% of dwellings had disrepair to essential elements.

Increased Awareness and Reporting:

▸ Media Reports: Recent media reports indicate a surge in complaints about dampness and mould in social housing, with some tenants being hospitalised due to related health issues. This suggests that the problem may be more widespread than previously thought or that people are becoming more aware of the health risks and more likely to report issues and seek compensation.

▸ GCR Context: The project's funding requirement was based in the Glasgow City Region. Craigdale Housing Association, Alpaca Global Solutions, and Tenants Hub Community Interests Company were already collaborating on a project, and the funding allowed this to be expanded to include the Community Engagement and AI feature.

Approach and Implementation

Collaborative Design

We collaborated with Craigdale Housing Association staff and residents through meetings, workshops, surveys, and feedback sessions to ensure that Hubble met the needs of both tenants and providers. A key focus was understanding how access to aggregated data could improve communication and service delivery. Tenant input was crucial in understanding their experiences with mould and identifying their priorities for information and solutions. The design process considered the varying levels of digital literacy among tenants and the need to ensure the platform was accessible regardless of their connectivity solutions, whether 5G, 4G, or fixed broadband. Glasgow is well-served by a 5G network that offers both strong signal strength and efficient data transfer, so we could use our purpose-built 5G data hubs to capture the data sent in real time.

Design Considerations

We prioritised user-friendliness for tenants with varying levels of digital literacy, ensuring that the aggregated data was presented in an accessible and understandable format. This included specific design choices, e.g., a simple mobile interface, alternative communication channels, and digital skills training. Data privacy was a key concern. We addressed this by anonymising sensor data before it is integrated into Hubble, using secure data storage that complies with GDPR, and providing tenants with transparent data policies explaining how their data is used and protected. The Hubble platform is designed to be accessible across various devices and connectivity options. For example, recognise that a significant proportion of Craigdale tenants use smartphones with mobile internet (73%, as reported in the 2022 Tenant Satisfaction Survey).

User-friendliness for staff was also prioritised, with intuitive dashboards that provided a holistic view of tenant and property data, enabling them to interpret the data and use it to inform maintenance decisions.

Resource Allocation

The 5G SCSP Innovation Fund provided funding. Resources included staff time from the housing associations and AGS, technology development costs for Hubble (including data integration components), sensor installation costs, and staff training materials.
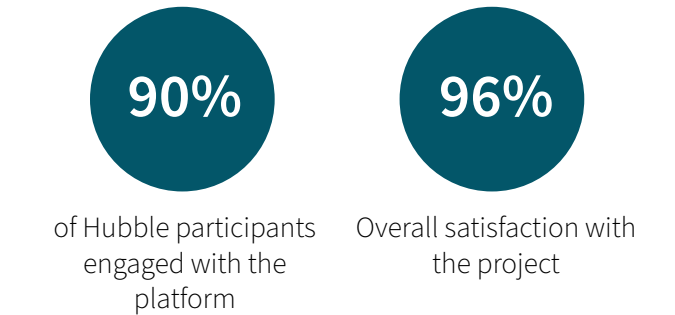
Technology or Methodologies Used

Hubble integrates with existing housing management systems through a Python application. The data integration layer is a core element which gathers information from disparate systems. Alpaca moisture sensors were deployed in ten tenant homes, collecting data on humidity, temperature, and moisture levels.

AI algorithms were used to predict mould risk based on this aggregated data, incorporating sensor data, weather patterns, tenant behaviour patterns (e.g., frequency of ventilation), and property characteristics (e.g., age, construction materials), identify properties with recurring mould issues, and prioritise maintenance interventionsm using the 5G network.

Evaluation Framework

90%

of Hubble participants engaged with the platform

96%

Overall satisfaction with the project

Qualitative Measures: Tenant and staff feedback was gathered through semi-structured interviews, focus groups, and surveys on their experience with Hubble and its impact on mould-related issues. We explored how Hubble and its data aggregation capabilities changed their understanding of mould risk and their ability to manage it.

Quantitative Data Collection: We tracked the number of reported mould cases, the number of proactive maintenance interventions related to mould, the time to resolve mould issues, tenant satisfaction with mould management, and the cost of mould remediation. Baseline data for these metrics was collected before Hubble's implementation through existing records and tenant surveys. Additionally, we monitored the adoption of the Customer Service App, including Tenant adoption rates (90% of Hubble participants engaged with the platform), potential for improved service request efficiency (e.g., AI-driven proactive alerts enabled by aggregated data), and tenant satisfaction scores (Overall satisfaction with the project was 96%). The collection and analysis of this quantitative data are facilitated by robust connectivity, ensuring that data is transmitted accurately and securely for evaluation.

Findings
Key Insights

Tenant Engagement: In the initial weeks following the platform's launch, we've observed initial signs of tenant interest. We are tracking the number of platform logins and app downloads and have seen a steady increase in initial registrations. Based on the 10 participants, 90% engaged with the online platform/portal. This indicates a strong preference for the digital interface within this group, which is consistent with the broader trend of smartphone internet access among Craigdale tenants (73%, as reported in the 2022 Tenant Satisfaction Survey). We focus on gathering baseline usage data and early user feedback on the platform's ability to provide accessible and relevant data.

Reduction of Mould: Within the 5 months, we've seen early indications of a positive impact on mould management. In the ten sensor-equipped homes, reported mould incidents decreased by 10%. Proactive alerts from the AI, driven by the aggregated data, led to 5 early intervention maintenance visits, preventing potential mould growth in those properties. We are now collecting more data to validate these initial findings over an extended period. This is a positive outcome, and while the Tenant Satisfaction Survey indicates high overall satisfaction with housing quality (95%), addressing mould proactively using integrated data insights can contribute to maintaining that satisfaction and preventing more serious issues.

AI-driven insights: Even in a short time, the AI has provided valuable insights. It identified two properties with higher-than-average humidity fluctuations, indicating potential ventilation issues. This allowed Craigdale Housing Association to conduct targeted inspections and address these concerns early. The AI also began to highlight patterns of humidity correlated with tenant behaviours, such as periods of low ventilation in specific properties, which is very useful for future educational programs. These insights were only possible by aggregating sensor data, property records, and tenant interactions.

Data integration challenges: A significant challenge encountered during the initial phase was integrating data from multiple operational databases. Many of these systems were managed by external partners or internal departments with strict data access protocols, which limited our ability to establish direct API connections and real-time data exchange. Consequently, we often relied on manual CSV exports, which introduced delays and potential data inconsistencies. Furthermore, these disparate databases' varying data structures and formats required extensive data mapping and transformation efforts. But these issues were expected, highlighting the critical need for robust data integration strategies in projects of this nature.

Feedback from 10 participants

- **Overall Satisfaction**: The 10 resident participants reported high satisfaction with the project. 60% were 'Very satisfied' and 40% were 'Fairly satisfied', resulting in an overall satisfaction rate of 100%. This indicates a strong positive response to the project and aligns with the generally high satisfaction levels (95% 'Very or fairly satisfied') reported by tenants in the 2022 Tenant Satisfaction Survey for Craigdale Housing Association.

- **Communication Effectiveness:** Participants generally felt that communication throughout the project was effective. 60% 'Strongly agreed' and 40% 'Agreed' with the statement. This reflects the broader positive sentiment towards communication from Craigdale Housing Association, where 98% of tenants felt the Association was 'Very or fairly good' at keeping them informed.

- **Information on Project Progress:** When explicitly asked about feeling informed about the progress, responses were slightly more nuanced: 10% 'Strongly agreed' while 90% 'Agreed'. This suggests that while overall communication was effective, there might be room for improvement in consistently keeping participants updated on progress.

- **Preferred Communication Methods:** The preferred communication methods among participants highlighted a firm reliance on the online platform/portal (9 people), with phone calls also being important (4 people). This contrasts somewhat with the broader Tenant Satisfaction Survey, where written communications were preferred (82% for newsletters and letters). This difference likely reflects the Hubble project's digital nature and the participants' specific demographics.

- **Participation Experience:** Participants reported a positive experience regarding their ability to provide feedback and input. 70% felt they 'Definitely' had sufficient opportunity, and 30% felt they had it 'To some extent'. 70% also found it 'Very easy' to provide feedback, and 30% found it 'Easy'. This suggests that the project created an accessible and welcoming environment for participant contributions, crucial for successful tenant engagement.

- **Project Goals and Valued Contributions:** The majority of participants (60%) 'Agreed' that the project's goals and objectives were clear, with 40% 'Strongly agreeing'. Importantly, all participants (100%) felt their contributions were valued, with 100% agreeing. This sense of value is a significant positive outcome, indicating that the project effectively empowered residents.

- **Sufficient Support**: Participants felt supported throughout the project (30% 'Strongly agreed' and 70% 'Agreed'). This highlights the importance of providing adequate support to residents involved in such initiatives.

- **Impact on Understanding of Damp and Mould:** The project directly impacted at least some participants' understanding of damp and mould, with some reporting a change in their daily actions. This aligns directly with the project's aim to address mould-related challenges and demonstrates a tangible benefit for residents.

- **Digital Technology Experience:** For those using digital technology within the project, the experience was overwhelmingly positive. 90% found it 'Very easy' to use, and 10% found it 'Easy'. This suggests that the digital tools employed were user-friendly and accessible, crucial for promoting digital inclusion.

- **Participant Demographics:** The participant group consisted of all females (100%) and was skewed towards the 35-64 age range (70%). This demographic information is essential for understanding the specific perspectives and needs represented in the feedback.

> "I have found the Hubble project fun and informative; I didn't realise we could learn so much about our lifestyles from a few sensors and an app", said Grace, a resident.

> "It will enable me to better target my workload due to the insight I get from the report". Linda Chelton, Craigdale.

> "This could be the Holy Grail of data aggregation for Housing" - Graeme Reid, Hub Asset Management.

Key Considerations

Facilitators

- **Strong Partnerships:** The robust collaboration between Craigdale Housing Association, Alpaca Global Solutions, and Tenants Hub Community Interests Company proved vital. Regular meetings, open communication channels, and a shared commitment to the project's objectives ensured that all stakeholders were aligned and could promptly address challenges. This collaborative spirit fostered a sense of shared ownership, which significantly contributed to the project's progress, particularly in navigating the complexities of data sharing and integration.

- **User-Centred Design**: Prioritising the user experience from the outset was a key facilitator. Conducting thorough user research, including surveys, workshops, and feedback sessions, allowed us to design an intuitive platform that met the specific needs of both tenants and staff. This user-

centred approach ensured that the platform was functional, accessible, and engaging, promoting the effective use of the aggregated data. Accessibility across different devices and connectivity levels was a key consideration in the user-centred design process.

▸ **Dedicated Training Programs**: Comprehensive training programs for tenants and staff were crucial for successful platform adoption. Tailored training sessions, covering everything from basic digital literacy to advanced data interpretation, empowered users to effectively use the platform's features and understand the value of the integrated data. Ongoing support and readily available help resources reinforced the training, ensuring users felt confident and supported. Practical training and ongoing support can be enhanced through digital platforms and online resources, which rely on good connectivity.

Barriers

▸ **Very Tight Timescale**: The project's ambitious timeline presented a significant challenge. The limited timeframe placed considerable pressure on all stakeholders, requiring efficient resource allocation and rapid problem-solving. This highlighted the importance of realistic project planning and the need to factor in potential delays, particularly when working with complex data integration processes.

▸ **Data Integration Complexities**: Integrating data from disparate legacy systems proved more complex than initially anticipated. Variations in data formats, restricted API access, and the need for extensive data cleansing created significant technical hurdles. Due to endpoint limitations, reliance on manual CSV exports further compounded these challenges. This emphasised the importance of thorough data discovery and planning during the initial stages of the project and the potential benefits of standardised data formats across systems.

▸ **Varying Levels of Staff Adoption:** Staff adoption varied across different departments, with some teams embracing the new platform more readily than others. This highlighted the need for targeted change management strategies, including clear communication of the platform's benefits, ongoing training, and addressing any concerns or resistance to change. Ensuring that all staff members felt confident and comfortable using the platform and its data outputs was essential for maximising its impact.

▸ **Varying Levels of Tenant Digital Literacy and Adoption**: Tenant digital literacy varied considerably, posing a challenge to platform adoption. Some tenants were highly digitally literate, while others required more support. This necessitated the development of accessible training materials,

personalised support sessions, and alternative communication channels. Building trust and addressing any concerns about data privacy were also crucial for encouraging tenant engagement and the willingness to interact with the data-driven platform.
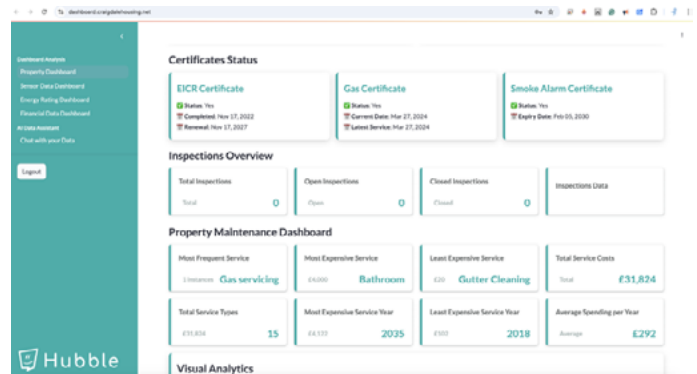
Learnings

▸ **Phased, Iterative Planning is Essential:** Comprehensive, phased planning is crucial, especially when integrating with multiple external systems. Adopt an agile, iterative development methodology for flexibility and responsiveness to emerging challenges. Create a Minimum Viable Product (MVP) with core data aggregation features and iterate based on user feedback.

▸ **Community Engagement is Paramount:** Foster genuine community engagement through open communication, transparent data practices, and active participation in decision-making. Built trust and rapport with tenants. Use community champions to drive adoption and ensure the platform provides valuable and relevant information. Digital platforms and communication tools, enabled by reliable connectivity, can facilitate community engagement, allowing for more inclusive and participatory decision-making.

▸ **Understand the Sociotechnical Context:** Consider the sociotechnical context, including digital literacy, socioeconomic disparities, and community dynamics. Provide offline support alongside digital solutions. Design the platform to be inclusive and ensure all tenants benefit from the aggregated data.

▸ **Prioritise Data Security and Ethical Considerations:** Implement stringent data protection measures, adhere to GDPR guidelines, and establish clear ethical frameworks. Explain data usage in simple terms. Be transparent about how data is collected, used, and shared.

▸ **Address Interoperability and System Integration Challenges:** Advocate for open data standards and APIs to facilitate seamless data exchange. Create a list of all data endpoints and their owners early in the project. Explore middleware solutions to bridge legacy systems. Invest in robust data integration tools

and technologies.

- **Design for Scalability and Sustainability:** Develop a modular platform architecture, leverage cloud-based infrastructure, and establish clear governance models. Explore sustainable funding models and partnerships. Create detailed documentation to facilitate adoption by other organisations. Ensure that the data architecture can support future growth and expansion. Scalability and sustainability often depend on robust and reliable connectivity to support increased data volumes and user traffic.

- **Establish Robust Feedback Loops:** Create a system of feedback loops from tenants and staff. Utilise multiple feedback channels and prioritise feedback effectively. Show users how their feedback has been used to improve the platform and its data presentation. Digital feedback channels, enabled by good connectivity, can facilitate more efficient and comprehensive feedback collection, leading to continuous improvement of the platform.

- **The Critical Importance of High-Quality Data:** Invest time in data validation and standardisation upfront. Prioritise data quality assessments and develop automated data validation tools. Standardise data across departments and organisations to ensure the accuracy and reliability of aggregated information.

- **Ongoing Training and Support are Vital:** Provide tenants with clear, concise tutorials and personalised support sessions. Offer staff in-depth training on data interpretation and platform functionality. Utilise a variety of training methods. Create a user forum and FAQ section. Ensure users are comfortable and confident using the platform and accessing the aggregated data.

- **Early and frequent communication with all stakeholders is vital.** This ensures everyone is aligned with the project's goals and timelines, especially regarding data sharing protocols and responsibilities.

While still in its early stages, the Hubble project has demonstrated the promising potential of AI-powered technology and effective data aggregation to enhance social housing tenant empowerment and improve operational efficiency within Registered Social Landlords. Despite facing challenges inherent in integrating disparate data systems and navigating varying levels of digital literacy, the project has laid a solid foundation for future development. The project's success is intrinsically linked to the availability of reliable and accessible connectivity, which underpins the functionality of the Hubble platform and its ability to deliver benefits to tenants and housing providers.

Early indications suggest the platform fosters increased tenant engagement, with a notable rise in platform registrations and initial usage. This indicates that providing tenants with accessible and relevant aggregated data can increase their involvement in housing services. While it's too early to draw definitive conclusions about mould reduction, deploying UNITY sensors and the AI's proactive alerts, driven by integrated data insights, have yielded valuable data, allowing Craigdale Housing Association to identify potential issues and intervene early.

The project has underscored the critical importance of robust planning, particularly regarding data integration strategies and stakeholder engagement. Due to restricted API access, the reliance on CSV exports highlighted the need for greater interoperability within the sector. Furthermore, the varying levels of digital literacy among tenants and staff reinforced the necessity of tailored training and ongoing support to ensure the effective use of the data-driven platform.

Crucially, the project has emphasised the value of strong partnerships, user-centred design, and a commitment to ethical data practices. By prioritising community engagement and fostering open communication, the project has built a foundation of trust that will be essential for long-term success and the ongoing development of the data aggregation capabilities. The project has also contributed to fostering the 5G ecosystem by demonstrating the demand for advanced connectivity solutions in the social housing sector.
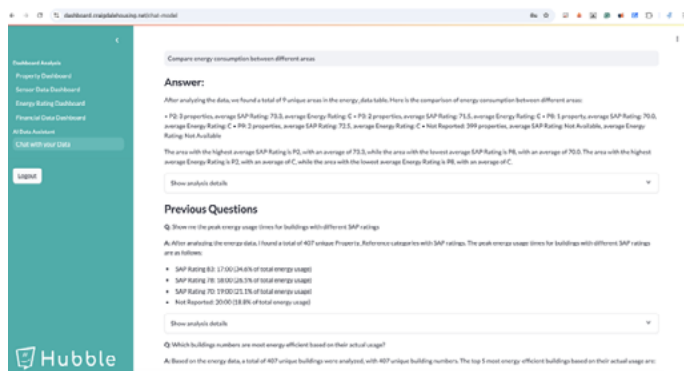
Looking ahead, the project's learnings will inform the ongoing development of Hubble, focusing on enhancing data integration processes, refining AI algorithms, and expanding the platform's functionality. The aim is to create a scalable and sustainable solution that can be adopted by other Registered Social Landlords across the Glasgow City Region and beyond, ultimately improving the lives of social housing tenants and driving innovation within the sector through unified data. This scalability and broader adoption will create new opportunities for support, potentially creating jobs for developers, account managers, trainers, and data specialists.

Next Steps

We plan to expand Hubble to other registered social landlords and develop additional AI-powered features, emphasising enhancing the platform's data aggregation capabilities.

Sustainability Plan

We will soon meet with the Glasgow and West of Scotland Forum of Housing Associations to discuss further opportunities and potential funding for this project, highlighting the long-term benefits of data-driven decision-making enabled by Hubble.

[Find out more about the project on the Glasgow City Region website.](#)

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