



**University of
Nottingham**

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Post-Occupation Evaluation Study Report

Project: Ingenuity Centre, Innovation Park

Date: May 2018



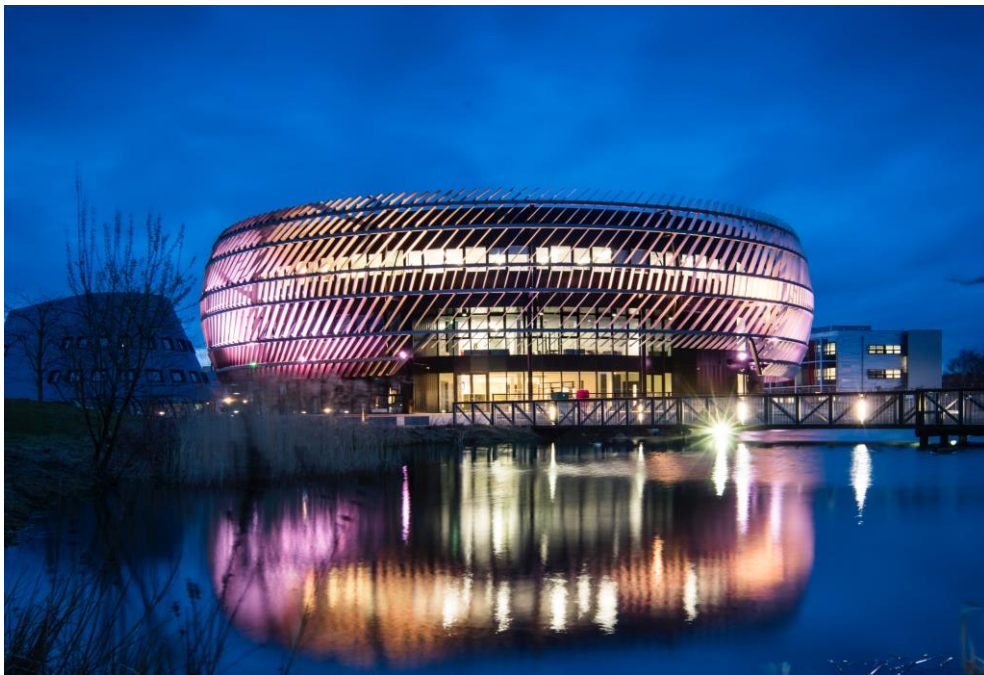
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INTRODUCTION

In January 2017, Building Understanding submitted a proposal, to the University of Nottingham Estates Department, to conduct post-occupation evaluations. The proposal was accepted. The Ingenuity Centre is the sixth project to be evaluated by Building Understanding.

This report aims to detail the strengths and the weaknesses of The Ingenuity Centre project, put forward recommendations and highlight best practise and excellence that can be applied to future projects at the University of Nottingham.



OBJECTIVES AND METHODOLOGY

OBJECTIVES OF THIS POST-OCCUPATION EVALUATION

- To bring to light any key issues associated with the building procurement process and management of the project
- To draw out stakeholder feedback concerning the design of the building and the experience of its end users
- To facilitate a half-day workshop, to discuss and debate the key issues revealed through the primary research
- To analyse all output from the face-to-face depth interviews, telephone interviews and the workshop to provide a summary report with recommendations

SCOPE OF THE STUDY

Building Understanding sought feedback on the following aspects of the Ingenuity Centre project:

- Overall user satisfaction
- Design issues
- Satisfaction with the space and specific room types
- Construction issues
- Security
- Accessibility
- Air quality
- Cleanliness
- Internal room temperature
- Lighting conditions: natural and artificial
- Operational technology: IT, data connectivity, AV equipment
- Sustainability
- Operations and facilities issues

STUDY PARTICIPANTS AND METHODOLOGIES

Building Understanding conducted face-to-face interviews and telephone interviews. Five different questionnaires were prepared in order to canvas feedback from respondents drawn from the following categories:

- Consultant team
- Contractors and suppliers
- End-user of the facility
- Estates office staff
- Internal client

Face-to-face depth interviews

The study included depth face-to-face interviews of approximately one hour's duration with the following stakeholder organisations:

- The University's Estates Department
- The project manager
- The main contractor
- The end user

Telephone interviews

In addition, telephone interviews were conducted with the following individuals:

Estates Office staff

- Building Surveyor
- IT manager
- Environment manager
- Senior engineer

Consultant team

- Consultant services engineer
- Consultant cost manager
- Consultant structural engineer
- The architect

The workshop

On Tuesday 15th May, a workshop took place involving 9 attendees from the various stakeholder groups. The workshop objectives were to:

- Discuss and debate the findings of the primary research
- Generate recommendations to be applied to future projects commissioned by the University of Nottingham
- Highlight nuggets of best practise and excellence revealed in the project that can be adopted and applied elsewhere

The workshop commenced with a presentation, by Building Understanding, of the findings of the primary research. Attendees were divided into breakout groups, with each group charged with assigning recommendations to specific points of feedback.

SAMPLE SIZES

It is important to emphasise that the quantitative statistics in this report are based on very small samples. A total of 15 respondents were approached and feedback was received from 12.

PROJECT DATA

Name of facility:	Ingenuity Centre
Location:	University of Nottingham Innovation Park
Gross area:	2,500m ²
Number of storeys:	Three
Users of the facility:	SME start ups
Room types:	Offices, meeting rooms
Start on site:	September 2015
Date completed:	December 2016
Period on site:	67 weeks
Gross construction cost:	£4.8 million excluding Vat
Funding:	University of Nottingham/BIS
Contract type:	Amended JCT DB2011 Form

PROJECT BACKGROUND

The Ingenuity Centre is the latest addition to the University of Nottingham Innovation Park (UNIP) at Jubilee Campus. It forms the basis of the University's successful application to be one of the first University Enterprise Zones in the country. The building facilitates reputational enhancement for the University's Innovation Park and for the University itself.

As the focal-point of the University Enterprise Zone, the building provides office-based accommodation for technology-driven start-up businesses and early-stage SMEs, from the local business community and from within the University. A number of companies have chosen to be based in the University environment, rather than elsewhere in the city.

Located on the former Raleigh Bike factory site, the 2,000m² three-storey building forms the shape of a tyre, reflecting the historical significance of the site whilst complementing the surrounding contemporary buildings, such as the Sir Colin Campbell Building. The brief to the architects was to create a building that encourages and supports innovative forms of collaborative working and learning.

Providing lettable space, which generates income for the University, the building offers a diverse mix of room types, from large open plan areas to more cellular offices and specialist practical zones. There are outward-facing cellular offices and also some facing inwards onto the atrium. The Centre is also used for conferences and other external events. The main infrastructure of the building was developed as part of this project, with occupiers then able to adapt the space to meet their own needs

The building is designed to achieve BREEAM excellent status.

THE BIG PICTURE

Overall, respondents report high levels of satisfaction with the Ingenuity Centre. While it was not a straightforward journey, the project is considered to have fulfilled the vision for the building.

Letting the space within the Centre has been very successful. In fact, it is anticipated that all office space will be let by the end of June 2018, as opposed to 60% which was forecast by this date, at the beginning of the project.

The initial design included a selection of small, medium and large offices in a building that could be highly flexible and altered almost 'at the whim' of the occupiers. As initial project costs were significantly higher than the budget allocated to this project, a substantial value engineering exercise took place and the budget was cut by approximately one third, resulting in simplification of the original design. The building is smaller than originally planned, the room heights have been reduced and the finishes are more basic. However, according to respondents, none of these changes has impacted on the experience of occupants or the operation of the building.

As tenancy contracts were drawn up to commence on a specific date, the building had to be handed over by that deadline. The Centre was not fully complete by the specified deadline, but it was habitable.

A circular building with a glazed core is innovative and visually impactful. Achieving the required standard of finish on circular walls was challenging however, this has resulted, externally, in a real 'wow factor'.

Designing floor plates and walls so that the building layout could be changed without moving windows and doors was truly innovative. Whilst a degree of flexibility was lost as a result of the value engineering exercise, the Ingenuity Centre still offers a good level of flexibility.

QUANTITATIVE FEEDBACK

Quantitative satisfaction ratings were collected during the face-to-face and telephone interviews. Respondents were asked to rate their satisfaction with various aspects of the project on a scale of 'zero' to 'ten', where 'one' represents 'very poor' and 'ten' represents 'excellent'.

Bar charts displaying the percentage split by rating, are shown in Appendix I. It is very important to emphasise that these quantitative results are drawn from very small samples and are therefore not statistically significant. Some respondents were only involved with specific aspects of the work and so their responses are limited to only that area. However, these results show, at a glance, the range of levels of satisfaction with the Ingenuity Centre project and building with scores ranging from three to nine.

The areas showing the highest levels of satisfaction in this study are understanding of the vision, satisfaction with the different room types, air quality and the relationships with the University and the extended team.

Lower levels of satisfaction were reported for noise levels and satisfaction with the contractors and suppliers.

Here is some commentary to the charts:

Overall satisfaction with the Ingenuity Centre

Eleven interviewees responded to this question. Nine people were mostly satisfied; four people rated it a "nine" and five people rated it an "eight". Two people were just satisfied rating it as "six", of those, one was due to the challenges involved in managing the project, and another due to the delay in receiving the BREEAM certification.

Understanding of the vision

The quantitative ratings suggest that respondents feel that the vision for the Ingenuity Centre was clearly understood by the consultant team. Of the three respondents asked to provide a rating, two were 'mostly satisfied', rating "eight" and one was 'totally satisfied' rating "ten".

Collaboration between the different members of the extended team

There was satisfaction among the seven interviewees asked about collaboration among the extended team. Most were 'mostly satisfied' with four rating "eight" and one rating "nine", with one rating "seven" and one a "six", both 'just satisfied'.

Quality and clarity of the communication between the different members of the extended team

Again, there was overall satisfaction with the response to the question on communication, with eight respondents opting for ratings of five "sevens" (just satisfied) and three "eights" (mostly satisfied).

Relationships that were built with the University and with the extended team

There was overall satisfaction among respondents around relationships. Of the eight respondents, seven were 'mostly satisfied' rating either "eight" (three respondents) or "nine" (four respondents), one respondent was 'just satisfied' providing a rating of "seven".

Satisfaction with room types

Four of the five people who commented on room types were mostly satisfied. One person rated them a "nine" while three rated them "eight". One respondent rated them "six", just satisfied.

Satisfaction with space in the Ingenuity Centre

Ten interviewees rated the space in the ingenuity Centre. Of these, seven were mostly satisfied, three rating it "nine" and four rating it "eight". Two people were just satisfied rating it "seven". However, one person was dissatisfied rating it "three". This respondent was impressed overall with the design of the building, but their rating relates specifically to how space has been adapted by end users.

Satisfaction with the main contractor

Eight interviewees responded to this question and all were satisfied to some extent with the main contractor. Four people were 'just satisfied', with two giving a rating of "six" and two "seven". Four people were 'mostly satisfied', three gave a rating of "eight" and one gave a rating of "nine".

Satisfaction with sub-contractors

There was a wider range of ratings on levels of satisfaction with subcontractors from the nine people who responded to this question. Two people were mostly satisfied, rating subcontractors and suppliers an "eight" or "nine". Four people were just satisfied giving a rating of "six". However, three people shared some dissatisfaction, two gave a rating of "five", while one gave a rating of "four". These ratings reflect the poor quality of workmanship from some of the subcontractors, especially the Brise Soleil contractor.

The finished quality of the facility

All respondents answered this question and were satisfied to some extent with the finished quality of the facility. Eight respondents were 'just satisfied', with two giving a rating of "six" and six giving a rating of "seven". Four respondents were 'mostly satisfied' with two giving a rating of "eight" and two giving a rating of "nine".

Handover

There was a mixed response from the three interviewees who responded to this question. One respondent was 'mostly satisfied' with the handover, rating this 'eight'; one was just satisfied, rating this "seven". However, one respondent gave a rating of 'five', this reflected some dissatisfaction with the fact that handover had to happen before the building was finished, especially externally.

Satisfaction with how defects were handled

There was some dissatisfaction among the seven interviewees who rated how defects were handled. While two respondents were mostly satisfied, giving a rating of “eight”, the remaining five respondents were all dissatisfied to some extent. One gave a rating of “five”, one person gave a rating of “three” while the remaining three respondents rated defects handling a “four”. While the number of defects to be managed was not actually higher than on other projects, the time taken to resolve them is reflected in these ratings.

Operation and management of the building

One of the two people responding to this question is totally satisfied with the operations and management of the Ingenuity Centre rating it a “ten”. The other respondent is mostly satisfied, rating this “eight”.

Provision for disabled users

One respondent answered this question giving the provision for disabled users a rating of ‘ten’, totally satisfied.

Security

Only one interviewee provided a rating for this question and awarded a “nine”; mostly satisfied.

Air quality

The one person who responded to this question is mostly satisfied with the air quality in Ingenuity Centre, rating it an “eight”.

Temperature

Again, one person responded to this question and is mostly satisfied with the temperature in Ingenuity Centre rating it a “nine”.

Lighting

The one person who responded to this question is mostly satisfied with the lighting in the Ingenuity centre, rating it a “nine”.

Noise levels

A rating of “eight”, ‘mostly satisfied’, was given for noise levels by one respondent.

Data connectivity and AV

Data connectivity is felt to be good with a rating of “nine”, ‘mostly satisfied’, given by one respondent.

AV attracted a rating of “one” ‘totally dissatisfied’ from a single respondent. AV provision was value engineered out of the project and this rating reflects dissatisfaction with that.

Cleanliness

Two people responded to this question, both are satisfied. One interviewee is totally satisfied, rating this “ten”. The other interviewee is mostly satisfied, rating this “eight”.

Toilet facilities

Only one person responded to this question and is mostly satisfied with the toilet facilities in the Ingenuity Centre rating them a “nine”.

Sustainability

The one respondent who rated this question was ‘just satisfied’ with sustainability, rating it as a “six”. While the respondent believed the building was performing in this regard, a lack of metering didn’t allow him to rate this higher.

Kitchenette

Kitchenettes are highly valued by the end user who rated them as a “ten”, ‘totally satisfied’.

QUALITATIVE FEEDBACK - THE DESIGN AND THE CONSTRUCTION PHASE

FEEDBACK RELATED TO THE DESIGN AND LAYOUT

The design

“I think the visual impact of the building is pretty spectacular. It’s pretty unique. In terms of ‘bang for your buck’ it’s got a lot going for it.”

Respondents agree that the Ingenuity Centre is a distinctive and impactful building. Within this Post-Occupation Evaluation, there is much positive feedback related to its design. The Ingenuity Centre sits comfortably alongside the neighbouring Sir Colin Campbell building. According to one respondent, the Centre is a pleasant building to occupy. On the ground floor, it is open and airy with a lot of light, making it much ‘more than just a modern office block’. There are breakout areas, big corridors and open spaces, which bring people together and encourage interaction.

One respondent feels proud of the structural frame and the way it was put together, even though it is not made of reinforced concrete as originally planned. Another interviewee mentioned the circular shape as a particular design success.

Detailed design work went into the Brise Soleil, solar-shading. Despite the problems with its installation, respondents are delighted with the effect of the fins, which have created a distinctive ‘halo effect’ around the building.

The external lighting is seen as a particularly effective feature, highlighting the fins and giving the building considerable visual impact after dark.

Despite the value engineering, participants in this study feel that the building has delivered on the flexibility of room sizes. Occupiers are generally satisfied with the design of the spaces and the building management team has been able to move walls around to facilitate differing occupier needs. In addition, the external covered terrace, is considered to be a real benefit with people holding meetings outside when the weather is good.

However, the inner circle of offices has proved more difficult to lease because there is a perception of little natural light and reduced air flow because the internally facing windows cannot be opened. At the workshop, it was revealed that in the original design, a good deal of the inner boundaries of these spaces were to be open onto the central atrium, which would have created a greater perception of light, and better airflow. However, privacy considerations, in response to concerns that conversations between occupiers using the internal offices may be overheard, meant that these spaces were enclosed with glass and screens. This was a conscious compromise by the University.

One other design issue raised, was that at certain times of year, the receptionist can be ‘blinded’ by afternoon winter sunshine. Efforts have been made to alleviate this, and the University’s safety officer is satisfied that all possible steps have been taken to mitigate this.

According to one respondent, the building can sometimes be ‘too smart’. Daylight controlled lights have attracted complaints from occupiers, who have said they would prefer a simple

on/off switch. Window controls to the meeting rooms have had to be altered as they were regularly opening and closing the windows and if there is a power surge, the building loses its water supply.

Space

This building has benefitted from learnings from the Sir Colin Campbell building, located next door, aiming to increase spatial flow and include more breakout space. The occupiers appear to be satisfied with the space, which does deliver what was intended.

According to the interviewee representing end users, post-occupation, spaces have been adaptable and are able to be used in a slightly different way than originally planned. Walls have been removed, and relocated to meet the needs of specific occupiers, which reflects the fact that the flexibility aspect of the design has been achieved. For example, during the build, individual offices in one area were merged to accommodate an organisation that needed an even larger space. The 'hot desking' areas were not being used sufficiently post construction and have been changed to a breakout seating space that students from elsewhere on the campus come and use.

Room types

There is a good mix of room types in the building that all deliver their intended functionality.

The cellular offices are functioning as intended and factor-in growth. As services tend to be in the false floors and ceilings, only the partition walls need to be moved. By combining several of these office, it is relatively easy to create a larger space. As yet, no occupier has asked for a room to be split in order to make it smaller.

The interactive spaces work well, especially the ground floor communal areas and the outside space. With very minimal alterations to furniture, structurally the building can be used for different purposes, which is considered to be excellent.

One respondent said that the showers should ideally cater separately for men and women. There is currently only one accessible shower, which is also the only changing room.

FEEDBACK RELATING TO THE VALUE ENGINEERING EXERCISE

Value engineering

There were, in fact, two separate value engineering exercises.

The first was not too stringent. The large external terrace was reduced in area, louvres were altered (they were originally intended to be timber), and some internal spaces were revised.

The second, more significant, exercise was undertaken to ensure that the project could be delivered on budget and this 'closed up' many of the planned open spaces, changed natural ventilation to fully mechanised (which has contributed to the problems of the internal offices) and changed the specification of the building's frame from concrete to steel.

Some radical ideas were put forward in the value engineering exercise including making the building rectangular rather than round.

The University asked the preferred main contractor to 'start from this floor plan and this sort of design, come back to us' with revised costings. The main contractor reduced the costs to an acceptable level, largely by simplifying the interior of the building and reducing its overall size. To achieve this, the main contractor engaged their own engineer and architect who were advised and supported by the University's consultant team.

The funding monies had to be spent within a specific time frame and this added a degree of pressure to the value engineering exercise. If there had been a more conventional time frame, value engineering could have been put back a bit and the contractors could have been clearer about what the end user was going to get in the finished product.

In order to meet project deadlines, details of the altered design had to be developed as the build progressed, through a collaborative process. According to one respondent, a design manager, appointed by the contractor, would have been a benefit in design development at this stage. However, this substantial value engineering, resulting in the building that was true to the original vision, would not have been achieved without collaborative work between the various team players from both the University and contractor. This ultimately allowed the aspirations for the building to be retained at an affordable level.

Key changes to the original design that took place during the value engineering exercise included:

- The flexible partitioning of the original design was removed. This would have enabled different sized rooms to be created very quickly and easily. The innovative style of services housing was also removed
- The building frame was designed to be of reinforced concrete, which would have allowed natural ventilation. This was replaced with a steel frame that has been 'boxed in' and requires mechanical ventilation
- The height of the glazing in the exhibition space was reduced which impacted the level of planned transparency. Also, doors are generally single rather than double width, as originally planned
- Provision of AV was completely removed from the original plans and became the responsibility of the end user to purchase

Recommendations

- Review the value engineering exercise to see how the process could be made more robust
- Where a VE exercise of this scale is required, take steps to allow more time to facilitate greater involvement of the supply chain and ensure that all parties have a clearer idea of what will be delivered
- Diarise full team and specialist team meetings to ensure the impact of the value engineering is not too detrimental to the project vision and ensure that decisions are aligning with expectations
- Allow more time post-VE for the mobilisation of sub-contractors

FEEDBACK RELATING TO RELATIONSHIPS, COMMUNICATION AND COLLABORATION

Collaboration within the wider team

“Overall we got a great project and it is probably testament that the shape of the team was right.”

Relationships amongst the project team were generally good, according to respondents. During the workshop discussions it was noted that there was buy-in and passion from the extended team to keep the vision intact through the project lifecycle. The levels of collaboration, flexibility and the willingness to make compromises, shown by the project team, were also raised several times throughout the workshop session, as a major factor contributing to the success of the project.

The University's design team felt that they worked well together, as they have worked as a team on previous University projects, and they had an established way of working. Since the Ingenuity Centre project, this team has worked together again on two further projects. Overall, one respondent felt the collaborative nature of the University-appointed team overcame issues that could have become more challenging. Everyone was prepared to “get their hands dirty” to find solutions.

Up until the tender, there was a high level of collaborative working between the architect, engineers, cost consultant, University's project manager and the end user, to pull together the design and brief. The value engineering exercise was less collaborative as each team was reviewing their own area and in a competitive phase of the project. Following this period, collaboration was more traditional, with a contractor and client representative. However, the design team feel that they accommodated and worked well with the main contractor's team of architects and engineers to ensure successful delivery of the project.

The capital projects officer drew praise for his concise, immediate responses. The Ingenuity Centre's operations director was lauded for his flexibility and his accommodating behaviour in the way that he helped the team make the necessary compromises. One respondent said that the University's architect and M&E designers demonstrated that they cared about the success of the project. The same individual also commented that the cost manager performed well, delivering the project on budget.

Specialist University expertise was highly valued on this project. For example, the University's IT manager discovered a major specification problem with cabling and made sure it was resolved adequately.

One respondent highlighted that a workshop at the beginning of the construction phase would have aided clarity around expectations of the altered design and helped collaboration among all players from the start. This would also have helped the wider team to understand and trust each other better once the contractor was on board. Another respondent suggested that more regular and more general contact between the University and the main contractor, would be beneficial in building stronger relationships.

Communication

Discussions during the workshop highlighted that there was open and timely communication between the project team throughout. There was a good flow of communication, especially between the contractor and University via the external project manager. Decisions could be made efficiently, often within the day.

In general, the flow of communication was good up until the final stages of the build. Generally, there was a high level of collaboration; nobody was obstructive in any way. There were examples given of when everyone pulled together, such as to resolve issues with the power to the building. There was one site meeting, which came up with a solution. The way communications worked via email meant everyone had the opportunity to add comments.

There was acknowledgement among respondents at the workshop, however, that, at times, there had been an unwillingness to deliver bad news both by the main contractor and also other members of the project team, and that, at times, the University had to push for communication.

The University's appointed external project manager performed well in facilitating communication between the contractor and the University's consultants team. This meant that while news might not be what individuals wanted to hear, they did see it and were able to act accordingly.

The usual project meetings were in place during this project but the minutes from the previous meeting were not discussed until the end of each client meeting and a lot of communication on the Ingenuity Centre project was conducted by email.

According to one respondent, the duct leading to the Sustainable Chemistry Building ran under the Ingenuity Centre. This took considerable effort to resolve. There was also a problem with the lift. The electrical controller for the external lighting kept losing connection and some development work was needed to resolve the problem. If the IT department had had prior notice, this would have been dealt with during or prior to construction and would not have been a defect.

Recommendations

- Consider bringing the extended team together for a social event at the start of a project, as a means of building relationships at the outset
- At the start of a project, be sure to establish a clear understanding amongst the project team of to what degree the client wants to be kept informed
- Understand from the outset, exactly what information is required by the University at which points in the project journey
- From the start, the contractor and the project manager should understand the way that the University wants to receive communication, i.e. whether it would be primarily by email, or face-to-face
- Encourage more sharing of news, both good and bad, between the University and end-user, the University and the main contractor, and the end-user and occupiers,
- To improve continuity, try to ensure it is the same individuals are involved throughout the project
- Take steps to involve the University's maintenance team in design meetings

FEEDBACK RELATING TO MAIN CONTRACTOR AND SUPPLY CHAIN

The main contractor

This was an unusual project for the main contractor as they were required to both design and build concurrently, as a result of the significant value engineering exercise.

On a positive note, respondents felt that the main contractor was good at positively engaging with the wider team. The contractor facilitated a number of visits by prospective occupiers and business partners during the build.

The main contractor's QS drew praise from one interviewee who commented that he was collaborative and open.

However, while there was overall satisfaction with the main contractor from participants in this study, there were some specific areas where it was felt they could have performed better. A stronger site management team would have been a benefit. In addition, the selection of certain subcontractors along with increased oversight of the quality of their workmanship, levels of resourcing and more efficient management of defects would have mitigated some of the issues.

While the main contractor engaged a team to complement the University's consultants, there was no design manager. With hindsight, discussions at the workshop noted that the inclusion of a design manager would have streamlined the process and managed the changes that were introduced quite late on in the programme.

Some respondents felt that while the main contractor was collaborative, they needed to be pushed and could be perceived as being "distant", meaning that the University did not always get answers early enough.

There was some challenging feedback concerning the supervision and management of the supply chain. For example, the windows were installed well but were then splashed with paint by the decorators. A glass balustrade was broken when something heavy was carried upstairs. Sometimes, it took time for quality problems to be identified. When there was a refit to incorporate the Ingenuity Lab upstairs, the radiators were moved and there were leaks, but these were not noticed until water was dripping through the lights into the open area downstairs.

One respondent also commented on issues with unacceptable behaviours from a subcontractor, saying that an individual was asked to leave the site due to bad language.

Having had difficulties coordinating the programme and managing certain subcontractors, the main contractor's site manager left the project suddenly after nine months. The main contractor then brought in a trainee site manager, who worked under the project manager.

Recommendations

- Ensure resilience between team members by having a thorough handover so that there is not so much reliance on knowledge held by one individual
- Consider using a data sharing portal to minimise anxieties that knowledge is lost when people leave the team

- Ensure closer management of the supply chain to control quality standards, behaviours and attendance on site

Supply chain

“Seventy percent did an adequate job, but thirty percent let them down.”

Feedback on the performance of subcontractors is mixed. The M&E consultant, drew praise from a number of respondents who felt they delivered high levels of quality, were prepared to go the ‘extra mile’ to get things done and were flexible to work within changing requirements. One respondent praised the building controls contractor, a company that works on all the University’s new buildings.

Other subcontractors receiving praise were the steel frame contractor and the roofing contractor, along with the firm that installed the metal deck and concrete floors.

Every respondent interviewed commented on the poor performance of the subcontractor that installed the Brise Soleil, the iconic halo of louvres circling the top of the building. The subcontractor used the wrong fittings which were not sufficiently substantial and only attached them at one end. Some of the fittings came off when Storm Doris struck, and they damaged the black cladding, so it had to be resprayed. These issues took eight to nine months to sort it out.

The Brise Soleil subcontractor further subcontracted the work to a company which, according to one respondent, went out of business. The main contractor could not get the subcontractor to return and rectify the situation. Fortunately, the glazing contractor working on another University building was able to resolve the problem. Unfortunately, this meant that, their installation had to take place once the building was occupied.

Another subcontractor that drew criticism was the landscaping contractor due to poor working practices. It was acknowledged, however, that they did step up to ensure the building area was presentable for the ministerial visit.

Updated drawings were also an issue, brought to light when work had to be done on the drains, the services were not where the drawings showed them to be and it appears that the subcontractor had not updated the drawings.

The decorators, lining contractor and joinery also drew criticism for the quality of workmanship. It emerged that they were using agency staff, who did not deliver the same level of quality as their own team. As the project was running late, their time on site was compressed, which was a contributing factor to the quality problems.

Several respondents feel that a University-appointed clerk of works would have been a valuable addition to the team. This role would have helped with ensuring product quality.

Recommendations

- Consider the appointment, by the University, of a clerk of works to help ensure the quality of delivery
- Insist on a sample panel from Brise Soleil contractors

FEEDBACK RELATING TO HANDOVER

“Towards the end it was a little bit chaotic in terms of the handover date which didn’t really move.”

Keeping to the handover date was important on this project, as tenancy contracts had been signed. However, handover was five to six weeks late and, at that point, the building was only partially complete. It was a further seven or eight weeks, after handover, that external works were finally complete. This resulted in a large number of defects to resolve.

Training was provided for relevant University staff. At the workshop, it was noted by one respondent representing end users, that more training at this point would have been useful, however, the main contractor’s team were working on another project nearby and were on hand to return quickly to sort out any issues.

It was noted in the workshop that recurrent quality issues had been raised with the contractor, but that nothing was done to address this, and the same faults were replicated on subsequent floors.

Despite issues relating to handover, there was a separate opening ceremony before the building was ready, because of a ministerial visit at short notice and it was noted that the contractor and the wider team contributed to making this a successful event.

Recommendations

- Consider creating a short and succinct building-users’ guide
- Confirm the expectations of stakeholders, such as the University of Nottingham’s maintenance team, regarding the detail of the handover
- Ensure the involvement of members of the University of Nottingham’s maintenance team to important elements of the handover

Resolution of defects

With the exception of the issues around the Brise Soleil, the workshop attendees acknowledged that this project did not have too many snags or defects to resolve. However, the time and the amount of chasing needed to resolve the defects has disappointed respondents. Defect resolution has taken a full year following completion of the build. While respondents do believe the contractor demonstrated a willingness to resolve defects, progress was slow because they struggled to get the subcontractors to return to site.

Once again, the Brise Soleil installation was mentioned by several respondents in relation to defects. The journey to resolution was fraught and it took over nine months for the issues to be fully resolved.

Still requiring resolution at the time that this report was written, was the ground floor offices not being sufficiently sound-proofed.

Although not strictly speaking a defect, the air curtain heaters at the entrance doors were reported to be extremely noisy so much so that end-users turn them off if there is a speaker conducting a workshop in the open space.

Recommendations

- Have a defined process for defects resolution agreed early in the project lifecycle
- Create a robust reporting process so that progress of defects resolution can be tracked
- Agree an earlier fixed date for the resolution of defects

FEEDBACK RELATING TO SUSTAINABILITY

The building meets BREEAM Excellent requirements although, at the time of writing this report, the certificate is still to be awarded.

The building can be heated from some of the excess heat generated from neighbouring buildings.

The electric metering in the building has been set up so that there is no main incoming meter, so energy consumption cannot be determined. It was felt by one respondent that there should be a main meter with sub-meters.



QUALITATIVE FEEDBACK - POST-OCCUPATION ISSUES

It is important to emphasise that the feedback in this section of the report is limited as only one end user was nominated to give feedback.

FEEDBACK RELATING TO THE QUALITY OF THE INTERNAL ENVIRONMENT

Natural light

Much natural light comes into the atrium area of the building through the glass dome. However, there is a perception of reduced natural light in the inner circle of offices which is making them more difficult to let. The absence of opening windows also makes these spaces less attractive.

Recommendations

- Enlarge the inner office spaces by making one larger office from 3 small office
- Consider relocating the reception desk, possibly altering the configuration of the desk so the disabled space is at the other end
- Think about introducing a 'riser desk' so the receptionist can re-position their computer as they wish
- Consider adding additional external planting to shield the area

Noise levels

There is a concern about noise transference in some downstairs offices where occupiers are able to hear their neighbours' conversations, which was reported as part of defects. Resolution was still outstanding at the end of March 2018.

Temperature

In general, the temperature in the building is comfortable. However, the lavatory facilities are reportedly a little cold.

Air

According to one respondent, airflow to the inner offices is not ideal, due to the lack of opening windows, otherwise across the building, it is acceptable.

Operational Technology

Equipment added since the build means that the WIFI provision is excellent. Before this the building suffered with connectivity blackspots. Mobile reception is also considered to be good.

Even though the IT department has made sure there are a lot of data points and BT points in the building, the respondent feels more could be welcomed.

The budget for AV equipment was completely removed from the project as part of the value engineering exercise. Over £20,000 of audio visual equipment has subsequently been purchased separately.

FEEDBACK RELATING TO PEOPLE WITH MOBILITY ISSUES

There are accessible lavatory facilities in the building and the alarms within them work well. There is also an accessible shower for disabled users. All are considered to be excellent and have attracted top qualitative ratings from the respondent.

FEEDBACK RELATING TO OPERATIONAL ISSUES

Operational management issues

At the time of writing this report, the defects phase was just coming to an end.

O&Ms have been received in draft version at the time of this report, electronic versions and updated drawings based on work completed are outstanding.

The University maintenance team has been involved at various points in the project:

- The senior building surveyor was involved when Storm Doris dislodged some of the fins from the Brise Soleil as this was a dangerous situation
- Maintenance resolved the drain misalignment defect
- The team was called in to mend the toilet cisterns

However, according to the respondents, it would have been helpful if maintenance had been involved in the project earlier in the handover process to make sure sub-contractor's work was to a reasonable standard. Without this involvement, maintenance personnel can attend a problem at the building with no idea of how the building works. There was an issue with the cisterns of some lavatories in the building, which were 'over flushing', as the sub-contractor responsible had shortened a pipe. The maintenance team rectified the problem, but had they been involved when the work was being done originally, they may have been able to prevent the problem from happening.

The University strives to introduce new technology into each new building wherever possible. This can cause a problem as maintenance may not keep, for instance, all the different light bulbs needed for the many different fittings and can cause delays in resolving a problem for an occupier.

Data points

According to one respondent, the building has been fitted with plenty of data points. Unfortunately, however, the first occupiers completely covered these with their fixed flooring, which will result in issues should access to them be needed.

Recommendations

- Encourage the earlier involvement of key University personnel, such as maintenance and IT teams, with the detailed design
- Look at the possibility of sharing the University's design guide with consultants and contractors at the relevant point in the project

- Examine the benefits of consistent provision of items like light fittings
- Arrange for the appropriate member of the maintenance team to check on relevant work

Security

Participants report that all the security features work well.

However, the building is very 'open' and there have been breaches of security as the building's assessable door has a delay to close, allowing intruders to access it out of hours.

The frosting added to the reception glass, for privacy, does mean that the receptionist only has a sight line to one exit.

Recommendations

- Consider removing the frosted glass so that both doors into the building can be clearly seen
- Look at adding a security camera and a speaker so that loiterers can be warned that they have been seen and should leave the area immediately
- Consider the possibility of introducing card access on the accessible door. It may be possible to programme the door so that it has a slower action for people identified as disabled

Door curtain vent

The same respondent mentioned that the door curtain vent, at the entrance to the building, creates a constant noise in the open areas, and was a major issue. Despite work to rectify this, the noise is still too loud, and the vent has to be turned off when there is a speaker in the communal area, so the audience can hear. The vent is sited in a different place than was planned because it would have compromised the fire exit in its planned location. Installing a door curtain in a round building was considered to have been something of a challenge by one respondent.

Recommendations

- Look at the possibility of reducing the fan velocity
- Consider replacing the air curtain with Besam automated doors, which feature integrated air curtains

Cleanliness

In general, the simple design helps keep the building clean. However, the internal windows, the balustrades and the external windows have not yet been cleaned. The one respondent believes that cleaning these will be a disruptive job as a cherry picker, and possibly scaffolding, will be required.

Recommendation

- Prompt the University's Domestic Services department to deliver the building's cleaning requirements for internal and external glass and the balustrades

Lavatory facilities

Now the problems with the cisterns have been resolved, the lavatories work well.

Shower facilities

At the outset, only one shower was incorporated into the design. Current facilities are not proportionate to those provided in the Colin Campbell building. More shower facilities would be welcomed by occupiers as this supports occupiers who would like to cycle to work and reduces the need for them to use facilities in other buildings.

The workshop participants decided that replacing the enlarged toilet cubicle with shower unit in both one of the men's toilets and in one ladies' toilet. It would be preferable for these additional showers are installed on the first and second floors, for better drainage. This would mean that there would be an accessible shower on every floor of the building.

Recommendation

- Consider replacing the enlarged toilet cubicle with shower unit in both one of the men's toilets and in one ladies' toilet

Locker space

There is a shortage of locker space in the Ingenuity Centre. During the workshop many options were discussed, and additional potential locations identified.

Recommendation

- Consider suitable sites where lockers could be located

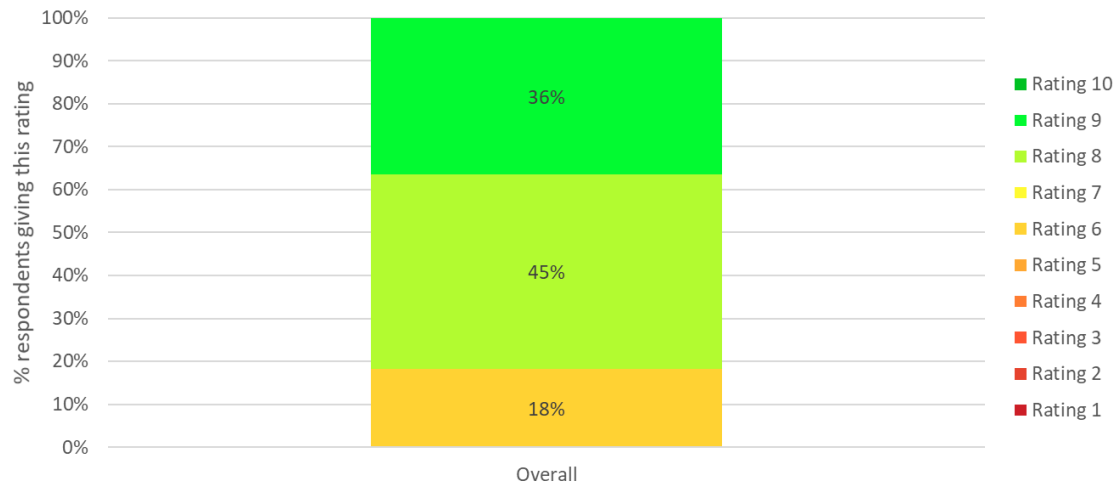
Kitchenettes

The vending machines originally supplied did not work, although the kitchenettes have been very successful.

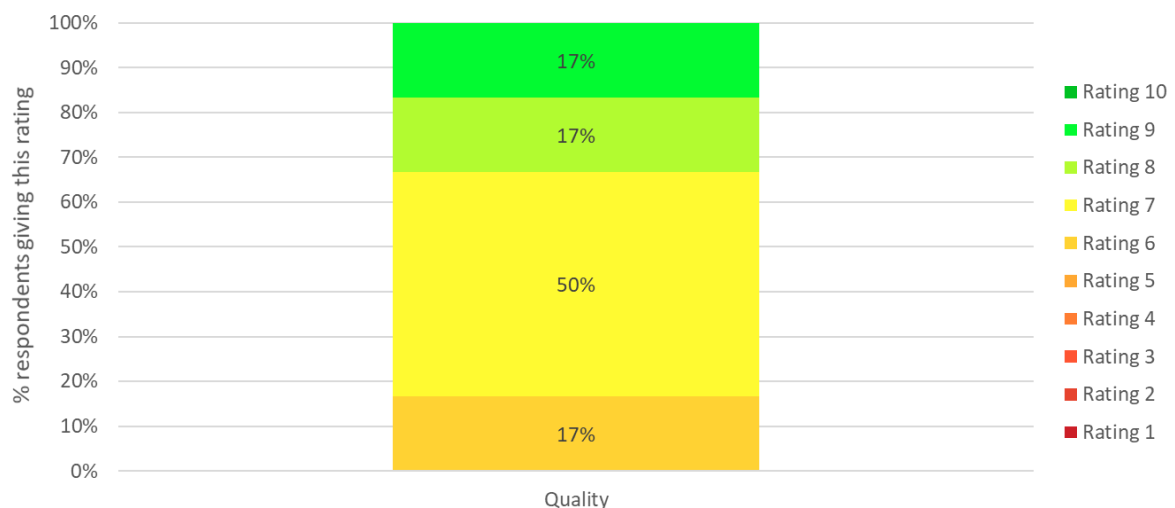
The only negative feedback about the kitchenettes is the amount of mess due to kitchenettes being very popular and receiving a high level of use.

APPENDIX I: QUANTITATIVE RESULTS

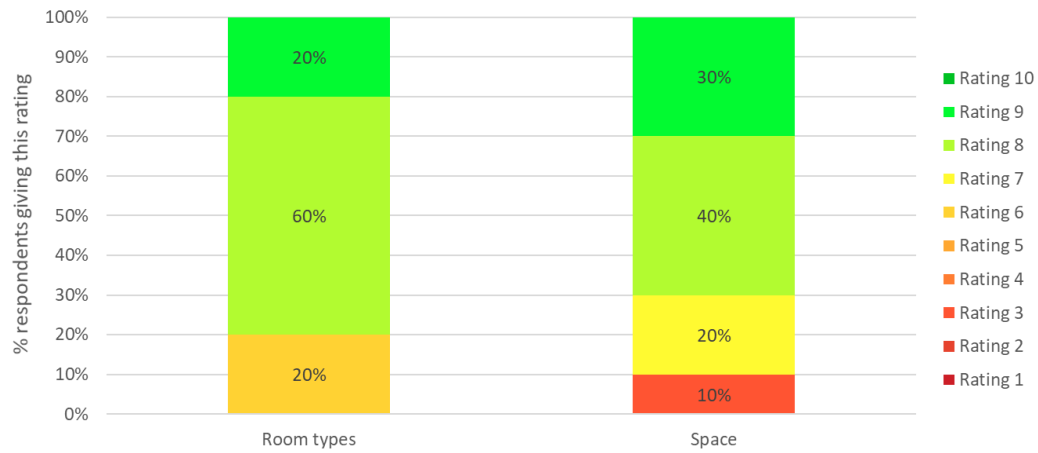
1.0 Overall Satisfaction with the Ingenuity Centre



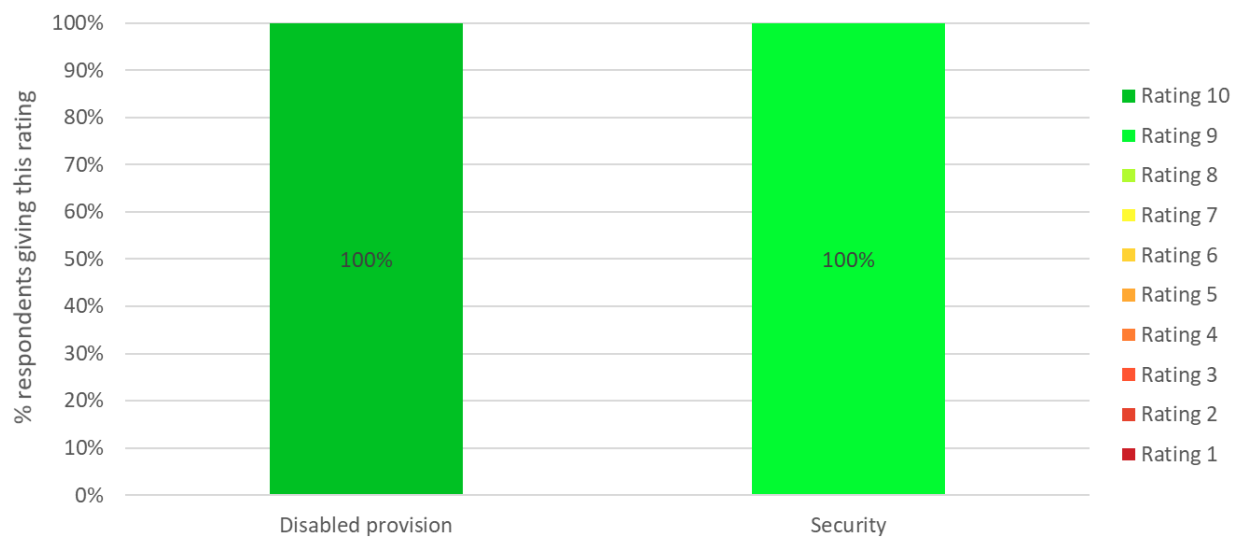
2.0 Satisfaction with the quality of the Ingenuity Centre



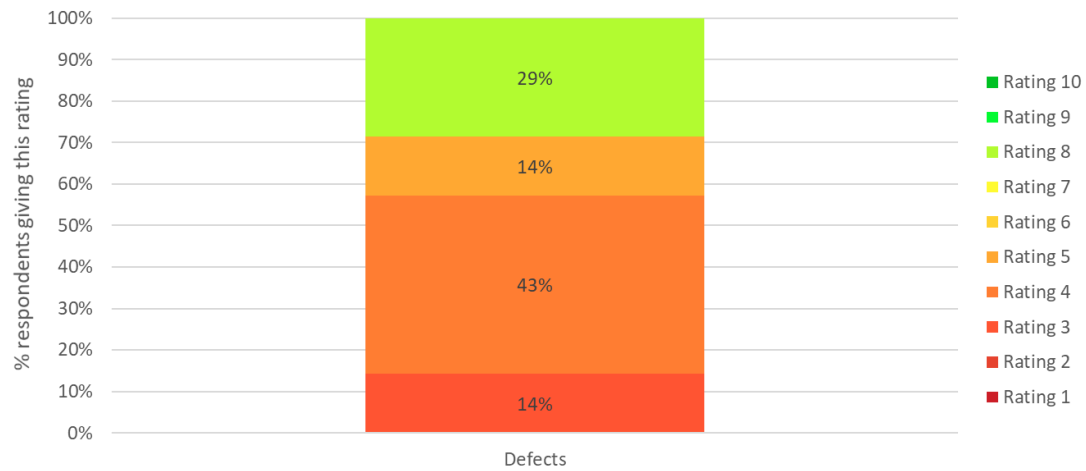
3.0 Satisfaction with the space in the Ingenuity Centre



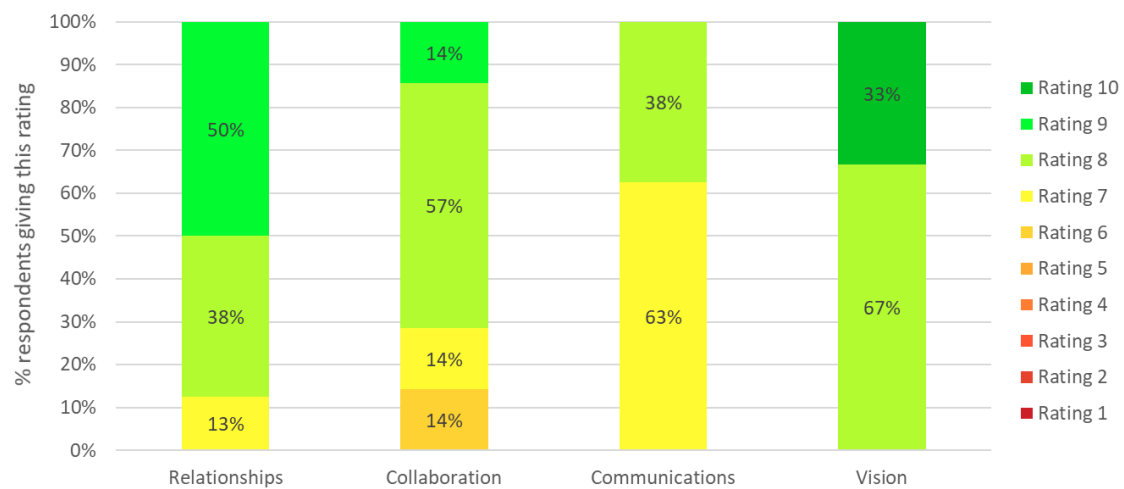
4.0 Satisfaction with accessibility and security of the Ingenuity Centre



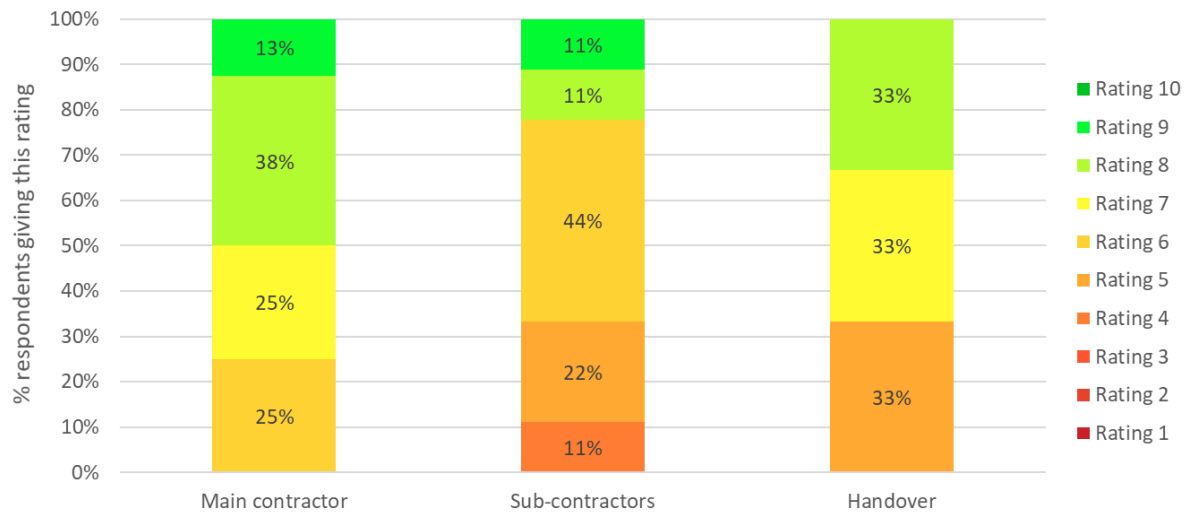
5.0 Satisfaction with how defects were handled



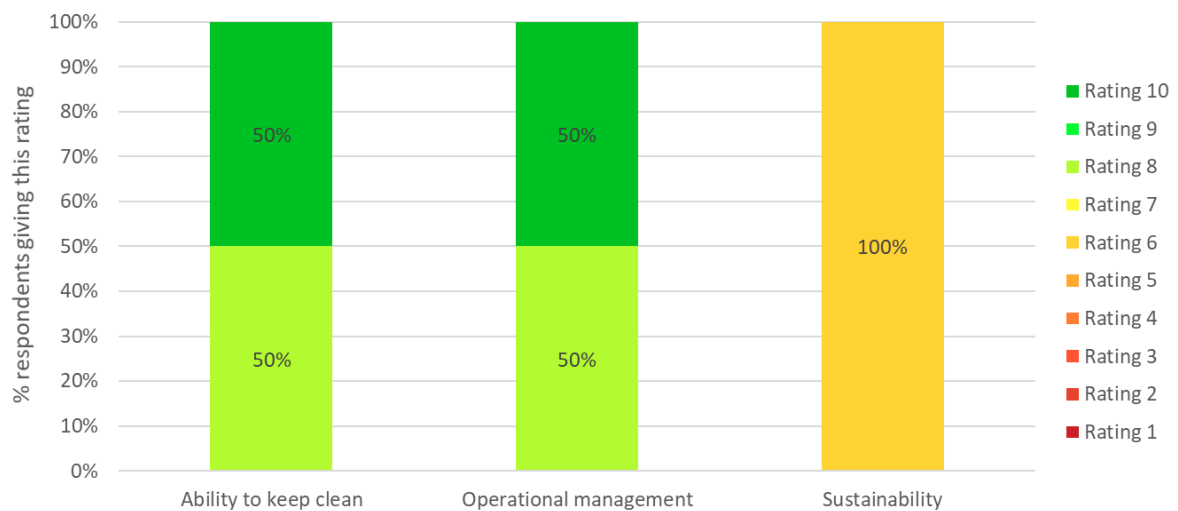
6.0 Satisfaction with interactions between members of the project team



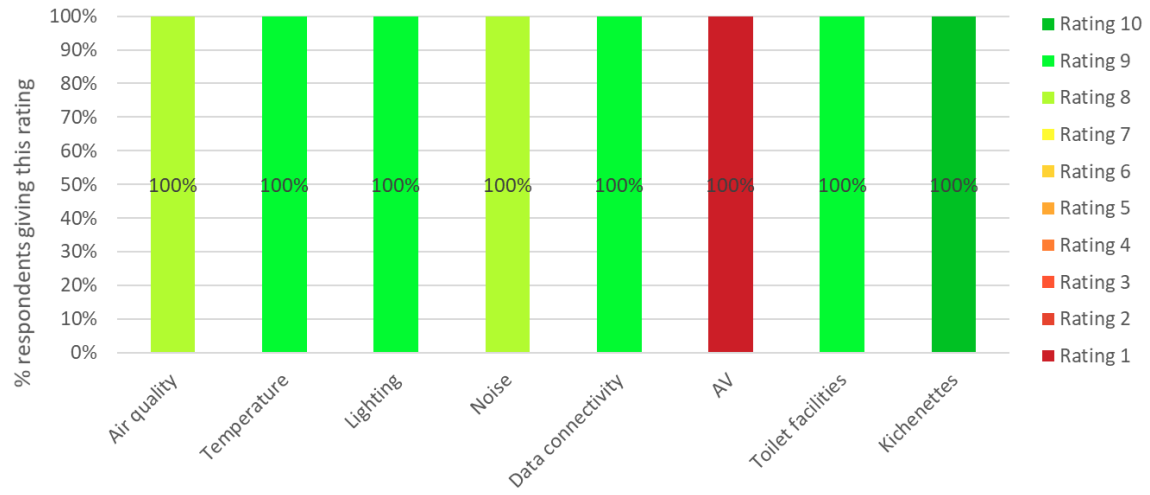
7.0 Satisfaction with the handover of the Ingenuity Centre and the performance of the team involved in the programme



8.0 Satisfaction with the cleanliness, operational performance and sustainability of the Ingenuity Centre



9.0 Satisfaction with the internal environment and with facilities at the Ingenuity Centre



APPENDIX III: SUMMARY OF RECOMMENDATIONS

RECOMMENDATIONS FOR APPLICATION TO FUTURE PROJECTS

Value engineering

- Review the value engineering exercise to see how the process could be made more robust
- Where a VE exercise of this scale is required, take steps to allow more time to facilitate greater involvement of the supply chain and ensure that all parties have a clearer idea of what will be delivered
- Diarise full team and specialist team meetings to ensure the impact of the value engineering is not too detrimental to the project vision and ensure that decisions are aligning with expectations
- Allow more time post-VE for the mobilisation of sub-contractors

Communication

- Consider bringing the extended team together for a social event at the start of a project, as a means of building relationships at the outset
- At the start of a project be sure to establish a clear understanding amongst the project team of to what degree the client wants to be kept informed
- Understand from the outset, exactly what information is required by the University at which points in the project journey
- From the start, the contractor and the project manager should understand the way that the University wants to receive communication, i.e. whether it would be primarily by email, or face-to-face
- Encourage more sharing of news, both good and bad, between the University and end-user, the University and the main contractor, and the end-user and occupiers,
- To improve continuity, try to ensure it is the same individuals are involved throughout the project
- Take steps to involve the University's maintenance team in design meetings

The main contractor

- Ensure resilience between team members by having a thorough handover so that there is not so much reliance on knowledge held by one individual
- Consider using a data sharing portal to minimise anxieties that knowledge is lost when people leave the team
- Ensure closer management of the supply chain to control quality standards, behaviours and attendance on site

The supply chain

- Consider the appointment, by the University, of a clerk of works to help ensure the quality of delivery

- Insist on a sample panel from Brise Soleil contractors

Handover

- Consider creating a short and succinct building-users' guide
- Confirm the expectations of stakeholders, such as the University of Nottingham's maintenance team, regarding the detail of the handover
- Ensure the involvement of members of the University of Nottingham's maintenance team to important elements of the handover

Resolution of defects

- Have a defined process for defects resolution agreed early in the project lifecycle
- Create a robust reporting process so that progress of defects resolution can be tracked
- Agree an earlier fixed date for the resolution of defects

Operational management issues

- Encourage the earlier involvement of key University personnel, such as maintenance and IT teams, with the detailed design
- Look at the possibility of sharing the University's design guide with consultants and contractors at the relevant point in the project
- Examine the benefits of consistent provision of items like light fittings
- Arrange for the appropriate member of the maintenance team to check on relevant work

RECOMMENDATIONS FOR POST COMPLETION CHANGES TO THE CENTRE

Natural light

- Enlarge the inner office spaces by making one larger office from 3 small office
- Consider relocating the reception desk, possibly altering the configuration of the desk so the disabled space is at the other end
- Think about introducing a 'riser desk' so the receptionist can re-position their computer as they wish
- Consider adding additional external planting to shield the area

Security

- Consider removing the frosted glass so that both doors into the building can be clearly seen
- Look at adding a security camera and a speaker so that loiterers can be warned that they have been seen and should leave the area immediately
- Consider the possibility of introducing card access on the accessible door. It may be possible to programme the door so that it has a slower action for people identified as disabled

Door curtain vent

- Look at the possibility of reducing the fan velocity
- Consider replacing the air curtain with Besam automated doors, which feature integrated air curtains

Cleanliness

- Prompt the University's Domestic Services department to deliver the building's cleaning requirements for internal and external glass and the balustrades

Shower facilities

- Consider replacing the enlarged toilet cubicle with shower unit in both one of the men's toilets and in one ladies' toilet

Locker space

- Consider suitable sites where lockers could be located