Case study: NCR, Discovery Centre, Dundee, UK

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CIB Taskgroup 51

USABILITY OF WORKPLACES

Case study: NCR, Discovery Centre, Dundee

Draft report

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1 SUMMARY

The investigations around the usability concept are focused on the relocation of NCR’s Global HQ of Research and Development to a purpose built premises in Dundee, Scotland. Relocation involved, as the first project in Europe, the design tool Community Based Planning (CbP). Evidence for relocation processes and activities which would support NCR in achieving more usable workplace was sought. Specific emphasis was placed on the ways of gaining the knowledge of business objectives as well as users’ activities, needs and communication patterns; and translation of these to a workplace settings and services. Data was to show the qualities of the workplace solutions, in terms usability: usefulness, adaptability, flexibility, functionality that is used, accessibility and ease of use. Data of the outcome measurement was collected, in terms of efficiency, effectiveness and satisfaction.

NCR’s previous R&D facilities were perceived outdated and spatial solutions were not seen to support research and development activity. R&D is constantly under competitive pressure and development of new, innovative, solutions is vital for success and pressures to continue to lead the market. Therefore need to support more efficient development processes was recognised in NCR.

The two main drivers for the relocation were the desire to provide a ‘world-class’ environment for the development of innovative product design; and identified retention problem. £20 million was invested for this new facility. Objectives for the relocation were:

- To separate the R&D from manufacturing, due to differences in the working cultures
- To bring together R&D activities that were distributed into 3 location, and within locations, different parts of the building
- To provide a ‘World Class’ office environment to support innovation and development of new products and to attract graduates
- To create more manufacturing space (Old R&D facilities converted back to manufacturing)

The involvement of staff was seen very important, because NCR wanted a significant change to their working environment. Traditionally this would have been very much a top-down approach where people had to adapt to what was given to them. However, in the R&D relocation it was decided that people had to be provided with an opportunity to get involved, partly from democratic reasons, but mainly to add value to the outcome and avoid design errors by finding out their requirement from the space.

NCR employed an external service provider to manage the change along with designing appropriate layouts and providing the furniture. The design process of Community Based Planning (CbP) was perceived to meet these criteria best by emphasising the need to understand the business and its people and their activities as well as treating the users as co-designers.

CbP process included various data collection methods, from leadership surveys and interviews to questionnaires and workshops engaging majority of NCR’s R&D staff. The data collection enabled the furniture supplier (who were also designers and change managers) to identify the main business objectives for the space; better understand the working culture and communication patterns within and across teams; identify specific spatial needs for different activities; and identify the current satisfaction rates in terms of the use of space.

Frequent communication in various levels was integral part of this relocation process. To provide a platform for communication, different types of groups were formed including: the steering group, leadership group, co-design groups, middle-management group and all staff as a one big group. The purposes for communication varied from strategic decision-making and co-designing to reporting back the progress of the relocation and suggested design ideas. The communication was mainly lead by the furniture supplier.

Post-occupancy measurements were carried out six months after the relocation, which indicated improvements in business dynamics (communication, learning, decision-making, innovation and work processes) as well as increased people satisfaction. The relocation process was perceived to be very successful and NCR feel very proud of their new R&D centre.
The workplace processes, such as meetings and walk-throughs involving FM and the steering, were put in place to ensure the space was supporting the business. However these faced out fairly soon after the move and were perceived as a final stage of the relocation (to check everything was finished), rather than an on-going activity. Lack of communication and need for more formal processes for the space management, especially for the internal moves, have been recognised by both, FM and the business.

After the relocation, NCR have had to deal with cost reductions, which have significantly affected also the facilities management practice. The FM strategy changed from co-locating the activities through consolidation to cost cutting, reducing the head counts in support services, increasing the density and outsourcing the Facilities Management.

User’s involvement in a later relocation process (another R&D group relocation to the Discovery Centre) had to also be limited. Reasons for this was perceived to be the cost reductions and therefore lack of choice in the possible furniture and lay-outs. Although staff involvement and communication were identified as success factors in the R&D relocation process, there is very little evidence that these principles have been implemented to the ongoing workplace management.

Questions to consider:

1. What qualities in the process enabled usability in this case?
2. What were the barriers (if any) in the process to achieve usability in this case, how could these been avoided?
3. Will the user involvement enable usability?
   - Importance of early user involvement in design and service procurement?
   - Possible risks associated with lack of involvement and communication?
   - What impact top-down approach in workplaces processes can have on usability?
4. Attributes of the workplace – what evidence is there for usability in NCR?
   - Usability qualities: usefulness, adaptability, flexibility, functionality that is used, accessibility and ease of use.
5. What should be the criteria for usability – usefulness of assessment?
   - Is this usability criterion right in terms of representing usability of workplaces – what other information needed?
   - Usefulness of measurement for usability: efficiency, effectiveness and satisfaction?
   - What is the business benefit in achieving usability of workplaces?
   - From whom and how should the evidence for usability be collected?
6. How important is it to adapt the change management processes of the relocation to the ongoing Facilities Management?
   - Changing from traditional top-down approach to shared decision making and then back to top-down approach again – what risks associated – How does this affect achieved usability?
   - Roles of Facilities Management and roles of the business units in adapting processes?
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2 FOCUS AREA

Usability approach is presented through the process of designing a workplace. The first European project, involving the design tool Community Based Planning (CbP), was carried out in NCR's new built R&D centre, which was completed in 2002.

The NCR case study focuses on the attributes of the working environment achieved through the workplace design process, and their contribution to achieving usability. The value of continuous user participation and shared decision-making power to enable integration of the business needs to the workplace design are demonstrated through the case study.

3 INTRODUCTION

3.1 NCR

NCR -- originally National Cash Register -- is an international company and provides technologies designed to enhance interaction among customers, suppliers, partners and employees. NCR was founded in 1884 and the company was built around the philosophy of concept of continuous innovation and the view that "a product is never finished". (Annual report 2001)

NCR are dedicated to being a world-class provider of Computer Products and Services to customers in all industries. The company leverages its expertise and market presence to provide computer solutions to its targeted industries. The company-wide competitive advantage is clear: innovation, creativity, and continuous improvement.

3.2 NCR in Dundee

NCR's Scottish operations have changed dramatically over the two decades. What began as a cash machine manufacturer in 1884 made the move from mechanical engineering to mechatronics (the combination of mechanical engineering, electronics systems and manufacturing) in the 1970s and finally on to the software engineering.¹

NCR's factory in Dundee was established over 50 years ago, when the primary activity was manufacturing. The research and development organisation gradually expanded during the 1980's. The company employs about 1600 people in Dundee, from which 500 are research and development staff.

According to records held by city of Dundee, NCR increased sales in 2002 more than 20% and 30% of world's cash points were manufactured at NCR's plant in Dundee.² Reasons behind the continued success of NCR in Dundee have believed to be the focus and creative strength of its research and development activities, investing in its people, as well as available, flexible and caring workforce and excellent educational facilities.³

3.3 Research & Development

NCR has 500 R&D associates who carry out tasks from product development and supply line management to marketing and customer and sales support. The activities include team meetings (formal and informal), project work, quiet work, light physical work, client presentations and prototyping. The facilities needed to support these activities include dedicated desks, project rooms, informal and formal meeting areas and product design labs.

Research and development activity is constantly under competitive pressure and development of new, innovative, solutions is vital for success. Pressures to continue to lead the market, and therefore need to support more efficient development processes, was recognised in NCR.

“Our lifeblood is in the ideas and creativity of our development engineers and we need to provide an environment where successful projects can be nurtured and flourish.”

Danny O'Brien Vice President of NCR Financial Solutions Group

“Our industry is rapidly changing and only the successful innovators, and those who constantly strive to do things better, will survive”

David Ramsay, NCR Vice President Global Operations


3.4 Relocation

The majority of 500 R&D associates were previously located on the top floor of main production facility, Gourdie Factory, which had been gradually converted into an office space. However, the research and development activity was still distributed in 3 different locations around Dundee.

The R&D facilities in the Gourdie Factory, however, provided outdated appearance and spatial solutions which were not seen to support research and development activity. NCR had understood that: “the traditional, ‘three person buckies’ were not the best way to promote team-building and team effort”. This view was supported by NCR’s global, annual, occupants satisfaction surveys, which had indicated problems with cleanliness, noise and lack of creativity.

In 1999 the decision was made to improve R&D facilities. The main driver for the relocation was the desire to provide a ‘world-class’ environment for development of innovative product design. Identified retention problem with software engineers was another driver. £20 million was invested for this new facility.

3.5 Property portfolio

Global:
NCR have a substantial Real Estate portfolio divided into four regions: Europe, Middle East and Africa (EMEA), Americas (Americas), Japan (Japan) and Asia Pacific (AP). This expands to 700 properties in 70 countries, with assets ranging from manufacturing facilities to sales and marketing offices.

As a solutions company with a relatively small manufacturing base most of the 150 annual new-build projects are small call centres, country offices and so forth. However approximately 10 to 15 projects per annum (globally) are substantial in nature both in scope and complexity. These projects vary from large warehouses to new manufacturing facilities.

Dundee:
NCR is located in outskirts of Dundee where they currently have three facilities, which are all on the same site:

- Main Production Facility Gourdie Factory 355,305 ft2 (33,043 m²)
- Craigowl Dispenser Factory 57,359 ft2 (5534 m²)
- Discovery Centre R&D Facility 133,056 ft2 (12374 m²)

The two factories were purposely built for manufacturing in 1960’s. When the research and development organisation later expanded, more and more parts of the manufacturing plant were handed over to the R&D offices and labs. The Discovery Centre was purposely built to accommodate the research and development department, the building was completed in 2002.

3.6 Facilities Management

3.6.1 Strategy

The facilities Management strategy at the time of the relocation (1999-2001) was rationalisation and consolidation of buildings within Dundee area. Since the relocation of R&D organisation to the Discovery Centre was completed, the strategy has been cost reduction. The cost reduction is emphasised globally in NCR and in all areas, not just in FM. In Dundee cost reduction is carried out in three areas in Facilities Management:

1. Outsource Facilities Management

Outsourcing of FM has taken place in most parts of NCR worldwide. So far the Dundee site has been unique, because of the parts making facility and the PCB assembly facility, located in Dundee, for which a lot of mechanics and technicians were working. These departments have now been outsourced, and in that sense Dundee is no longer Unique. This will mean that the FM services, which in June 2003 had 29 staff will, beginning of next year (8 months later) have 3 staff.
2. Reduce the cost/sqf by increasing the density

In the Discovery Centre, as in the global head quarters, focus of cost reduction is on reducing the cost/sqf by increasing the density. This is a global strategy and is aimed to be implemented in the Discovery Centre within the next year, or sooner.

“This will impact many of the activities in the Discovery Centre and will involve a lot of work in planning the layouts and setting them up and allocating these to the people. Already it can be seen that people have not been responding well to the changes and the increase of the density will mean that a lot of people won’t be responding well to be having to move around.”

3. Review the support services

The services will be reviewed, once the outsourced Facilities Management is in place:

“At the Gourdie Factory, which is an older building, there has been services that have been running for several years, and FM is now investigating these contracts and in many cases we are aiming to reduce them, for example in terms of head count.”

3.6.2 Structure and services

Currently there is 26 in-house staff in the Facilities Management organisation, made up of:
10 facilities technicians, 7 management, 5 office services, 2 labourers, 1 joiner and 1 secretary/administrator

The main outsourced support services include: Cleaning, catering, security, window cleaning, landscaping, snow clearing, forklift maintenance and PAT testing. The contracts are typically 3-year contracts (Some of the contractors are currently working on an extension with a 3-months notice period, until the outsourced FM will take place and review the services)

Facilities Management is divided into three management services and projects:
- Customer Services and projects
- Facilities Management and projects
- Property management, office services and projects

<table>
<thead>
<tr>
<th></th>
<th>Customer Service</th>
<th>Facilities Management and projects</th>
<th>Property management, office services and projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of staff</td>
<td>14</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Key responsibilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Control of contractors operations and supervision</td>
<td>- Building maintenance, repairs and alterations</td>
<td>- Space planning</td>
</tr>
<tr>
<td></td>
<td>- Technicians training, supervision and control</td>
<td>- Grounds maintenance</td>
<td>- Lease management</td>
</tr>
<tr>
<td></td>
<td>- Facilities front desk support</td>
<td>- Space planning support</td>
<td>- Budgets</td>
</tr>
<tr>
<td>Support activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Customer focused co-ordination of day to day activities</td>
<td>- Health and safety</td>
<td>- Utilities contracts</td>
</tr>
<tr>
<td></td>
<td>- Review/renew all maintenance agreements</td>
<td>- Waste management</td>
<td>- Office services</td>
</tr>
<tr>
<td></td>
<td>- Development of facilities services</td>
<td>- Records management</td>
<td>- Security</td>
</tr>
<tr>
<td></td>
<td>- Compliance and record keeping</td>
<td></td>
<td>- Provide technical support</td>
</tr>
<tr>
<td></td>
<td>- Continual monitoring of performance against set objectives</td>
<td></td>
<td>- Facilities Response desk support</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7 Source: Jim Adam, Head of Facilities Management, Oct 2003
8 Source: Jim Adam, Head of Facilities Management, Oct 2003
4 RELOCATION PROCESS OF R&D

4.1 Stakeholders
CRE/FM defined the process and procurement strategy. In strategic level CEO, top management were involved, and a ‘Steering Committee’ was launched to lead the project. FM was chosen as the project manager. The Steering Committee involved all Senior managers (BU managers), FM Director, Supplier, end users.

Furniture supplier was expected to consult on change management, and therefore, had a major role in the relocation process as well.

4.2 Building needs - Developing the brief
Before the R&D relocation, majority of NCR’s space management standards came from America, which were very much status based. This idea was questioned in the beginning, before the building was procured, and the aim was to design a building based on the needs rather than a status. Therefore, CRE and FM, in co-operation, began to look at the solutions that would improve the business processes by designing a workplace that would match these processes. As a result of this, NCR developed ‘Villages’ - concept that would introduce new forms of working in these spaces. The following principles to provide this concept could be identified from the furniture procurement brief:

1. Need for highly flexible and fluid working environment, such as mobile working areas and workstations
2. Need for team areas, and individual working areas
3. Development of service centres, which house quiet areas, photocopying, meeting rooms, centralized printers, IT closets if required, other services areas if required and everything necessary to service the villages.
4. Separation of villages to provide privacy and to control the noise.

4.3 Objectives
Objectives for the relocation:
- To separate the R&D from manufacturing, due to differences in the working cultures
- To bring together R&D activities that were distributed into 3 location, and within locations, different parts of the building
- To provide a ‘World Class’ office environment to support innovation and development of new products and to attract graduates
- To create more manufacturing space (Old R&D facilities converted back to manufacturing)

4.4 Process framework
Main stages of the relocation, could be identified from the material collected:
1. The process started with recognising the need
2. Investment decision was instigated in Dundee and approved via Head Office
3. FM and top management developed a brief for the building procurement
4. Choice of location
5. Building procurement and beginning of the building design (Following the corporate procurement process)
6. FM and top management developed a brief for the furniture procurement
7. Furniture procurement - Community based planning (in the beginning of the building construction) (following the corporate procurement process)
8. Start of the building construction
9. Identifying the business need – Georgeson and leadership team (CbP phases: uncover)
10. Identifying people activities and communication patterns – Georgeson lead questionnaire, workshops and observations (CbP phases: discover)
11. Identifying spatial needs (CbP phases: explore)
12. Pilot office was set up and observed by Georgeson
13. Implementation of space
14. Expanding the current service providers into the new facility
15. Move into the building from Gourdie Factory
16. Post-occupancy survey 6 months later
4.5 Choice of location

NCR wanted a campus approach and the land was available near the current site, therefore this was a natural choice for the location and no search matrix was needed to be developed.\(^9\)

Location in Scotland also meant: the access to Scottish universities, which was seen to have impact on the research and development works; A good transportation network; Availability of land and buildings for industrial growth; Good industrial relations; as well as availability of commendable support services from the private and central government.\(^10\)

4.6 Building design

The procurement of 148000 ft\(^2\) (approx) comprising Research, Development, and Marketing Offices, together with all associated support areas that were required in the brief, was made before any major communication with staff was carried out. At this point the relocation project was still very much top-management lead.

The project was to provide shell and core areas for subsequent fitting out by the tenant's contractors. The initial layout was to divide the floors space into four separate areas. The construction period was 15 months from contract commencement.

4.7 Office design

While NCR was desirous of introducing new concepts and a state of the art method of working, the project objective (as presented in the furniture procurement brief) was to fulfil the needs of the end users with regards to furniture within the budget, while providing a highly flexible and pleasant working environment.\(^12\)

4.7.1 Involvement of staff

The involvement of staff was seen very important, because NCR wanted a significant change to their working environment. Traditionally this would have been very much a top-down approach where senior management would determine the appropriate amount of space needed, followed by The Facilities deciding how the desks would be laid out and the space allocated according to the status. Therefore, traditionally people had to adapt to what was given to them.\(^8\)

In the R&D relocation it was decided that people had to be provided with an opportunity to get involved and have their say, partly from democratic reasons, but mainly to add value to the outcome and avoid design errors by finding out their requirement from the space.\(^8\)

> ‘From the change management point of view, more you can involve people in the change the smoother the change will go through’

Ray Robertson, NCR

4.7.2 Furniture procurement brief

NCR asked two global furniture suppliers to present their ability to meet the brief and to provide a process to best fit with NCR’s work processes.

According to the furniture procurement brief, the selection criteria was based on the service provider’s ability:

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9 Ray Robertson, NCR, October 2003
11 Source: http://www.jameskellerestates.com/
12 Project Brief – company document
1. To provide a FULL service, including needs analysis, furniture solution, consultation with end users, budget management, design, manufacture, installation and operation.
2. To undertake change management and the ‘selling’ of the concept to the end users and persons who will occupy the building.
3. To demonstrate generic responses to the flexible and fluid ‘village’ concept -provide ‘out of the box’ solutions while maintaining the integrity of the building and meeting the corporate space standards
4. To demonstrate generic responses to the service centres, including furniture arrangements and room designations
5. To carry out some areas of the interior design work.
6. To provide detail listing out the steps necessary to deliver this full service and a timetable/schedule detailing these steps and the approximate timeframes for each task. (This schedule must be compatible with the master schedule)

4.7.3 Response to the brief -Community based Planning

Furniture supplier / workplace consultant, Georgeson, met the criteria best by presenting the workplace design process of Community Based Planning. The process is based on people connections, which strengthen business dynamics by facilitating learning; improving communication; optimising work process; increasing innovation and developing decision-making.

The process allows designers to uncover and understand the informal networks that constitute the way people work, learn, innovate and communicate in the workplace by studying information collected about how individuals, teams and communities interact and manage their information. Most importantly, the users of the space become co-designers in the planning and design process. 13

The ‘Community Based Planning’ process is developed by Steelcase, and their service supplier Georgeson carried out the project for NCR. ‘Community based Planning’ process involved six steps14:

1. **Prepare**: To determine suitability and fit to the process
2. **Uncover**: To identify critical business issues with the leadership
3. **Discover**: To diagnose organisational health, to gain valuable insights into NCR culture and to identify key people within the networks within NCR.
4. **Explore**: Looking into findings from the data collection and analysing the problems, translating solutions and engaging users to the design process. The restructuring the space and defining new work settings starts in this phase in order to solve the problems the business may have in its working environment and culture.
5. **Implement**: Designing the space considering the impact the work processes, Human Resource, Technology and space have on improving the business results.
6. **Measure**: To engage users to ensure the current working environment meets the users’ needs. Post occupancy evaluation results to be compared with the pre-evaluation and network analysis. Measuring organisational health.

4.7.4 Communication

Frequent communication was an integral part of the workplace design process. Different types of groups were developed throughout the project (Table 1). Forming of the Steering Group was initiated by NCR’s HR, right in the beginning of the process. The Leadership Group was also formed in the beginning of the project to support the collection of data and communication in a more strategic level. The purpose of communication in the levels of the whole group, co-design groups and management groups was to communicate ideas and raise discussion and get feedback on the future ways of working (such as working in a open plan) specific to the groups.

13 Georgeson presentation
14 Georgeson presentation
Table 1. Groups formed during the relocation project

<table>
<thead>
<tr>
<th>Type of group</th>
<th>No. people involved</th>
<th>Frequency</th>
<th>Purpose</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering group</td>
<td>12 - Formed by NCR, initiated by HR. Formed with middle management within departments</td>
<td>Monthly</td>
<td>Georgeson to update the group with progress, group communicating back to their teams</td>
<td>Meetings with Georgeson</td>
</tr>
<tr>
<td>Leadership group</td>
<td>12 senior managers</td>
<td>3 times</td>
<td>Present the insights of the data collection - Identify business issues and establish strategic objectives for the new R&amp;D facility - Approval of design ideas went through the leadership group</td>
<td>- Strategic intent - workshop and report - Business dynamic evaluation –before and after - Georgeson presentations and presentations with Georgeson to the whole group</td>
</tr>
<tr>
<td>Co-design groups</td>
<td>500 divided into 12 groups (which were divided into smaller groups within co-design sessions)</td>
<td>3-4 times with each group</td>
<td>At first, to present the findings from e-tool questionnaire specific to the groups and to explain the benefits of working differently. Later to communicate design solutions specific to this group.</td>
<td>Photos taken of likes-dislikes, comfortable places, where you meet</td>
</tr>
<tr>
<td>Whole group</td>
<td>500</td>
<td>3 Kick off, half way and before move</td>
<td>To communicate the CbP process and progress in design for everybody.</td>
<td>Leadership and Georgeson carried out presentations</td>
</tr>
<tr>
<td>Manager group</td>
<td>30-40 - Included all department managers.</td>
<td>3</td>
<td>Formed due to increasing concerns the management about new ways of working, for example, working in an open plan office.</td>
<td>Formal presentations to explain advantages of open plan working</td>
</tr>
</tbody>
</table>

Additional to communicating with the specific groups, there was also other means of communication (Table 2), such as NCR’s internal Magazine and Internal TV screens. A Pilot office was also built to the old office space to demonstrate the kind of work setting to be created in the new office. Pilot was aimed to be as realistic as possible - partition walls, carpets, lighting, furniture, technology and storage space - were all put in place. The pilot was set up to support the design stage of specifying furniture, technology etc. mentioned above.

A project team was asked to volunteer to use the space for six weeks - a group of 12 software engineers volunteered. The team was to log their comments on the Intranet, so that everybody could see them. After six weeks (intended time) the group wanted to stay in the pilot settings until the move. Another pilot was also set up 4 weeks later with a group of 10 hardware engineers, because they felt that their needs might differ from the software engineers. This experiment was set up for few weeks only and removed when it was tested an approved to fit the needs of hardware engineers as well.

Table 2. Additional means of communication

<table>
<thead>
<tr>
<th>Mean of communication</th>
<th>Volume</th>
<th>Frequency</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spotlight magazine</td>
<td>6</td>
<td>Every 2 months</td>
<td>To inform the progress of relocation and response to general concerns rose through communication with people.</td>
</tr>
<tr>
<td>Internal TV</td>
<td>Throughout the building</td>
<td>All the time</td>
<td>Showing presentation on insights of data collection and progress in the project</td>
</tr>
<tr>
<td>Pilot office</td>
<td>Teams of 12 and 10 worked on these settings. Co-design groups taken to view the pilot settings</td>
<td>Available all the time</td>
<td>To create similar settings to the future office. Team of 12 volunteered.</td>
</tr>
<tr>
<td>Site visits</td>
<td>Co-location teams</td>
<td>3 weeks before</td>
<td>Show the new facilities, where they would be working, and how the space worked</td>
</tr>
<tr>
<td>Intranet</td>
<td>During the pilot office</td>
<td>During the pilot office</td>
<td>Staff working in the pilot office setting were to log their comments on the intranet</td>
</tr>
</tbody>
</table>
4.7.5 Collection of data

To enable designers to better understand what kind of spatial solutions would best support the business and the R&D activities, series of studies were carried out in the beginning of the CbP process, before any decisions of internal lay-outs were taken. However, the building was already been designed, Georgeson had an opportunity to change the layout to more open plan. (Instead of dividing the floor space into four, it was divided into two large open plan areas).

The table 3 indicates the main methods to collect information from different stakeholders and the timing and purpose of the data collection:

<table>
<thead>
<tr>
<th>Tool / method</th>
<th>Stage of process</th>
<th>Participants</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business dynamic card</td>
<td>Right in the beginning and 6 months after</td>
<td>12 people - Leadership team</td>
<td>To identify present and admired, and pre occupancy, influence key business dynamics (pre defined) have on leadership vision. Dynamics; communication, learning, innovation, decision-making and work processes.</td>
</tr>
<tr>
<td>Leadership interviews</td>
<td>Right in the beginning</td>
<td>12 people - Leadership team</td>
<td>To identify the main issues and goals for the new R&amp;D centre (concerning issues like culture, trust, communication, organisation – Table 4)</td>
</tr>
<tr>
<td>Activities, needs assessment¹</td>
<td>Beginning</td>
<td>- All 500, including leadership</td>
<td>To identify what kind of: - spaces are used, how often and for what purpose; - storing in place</td>
</tr>
<tr>
<td>Approx 80 questions</td>
<td>Beginning</td>
<td>- 80 questions</td>
<td></td>
</tr>
<tr>
<td>Pre / Post occupancy satisfaction*</td>
<td>Beginning and 6 months after</td>
<td>- All 500, including leadership</td>
<td>To indicate importance of and satisfaction with (for example): - environmental conditions; - appropriateness of space to support activities; - feel of working environment generally</td>
</tr>
<tr>
<td>26 questions</td>
<td></td>
<td>- After: 70%</td>
<td></td>
</tr>
<tr>
<td>Communication network*</td>
<td>Beginning and 6 months after</td>
<td>- All 500, including leadership</td>
<td>To identify patterns of communication: - general discussion about work - source of advice - problem solving - idea exchange - who to sits next to</td>
</tr>
<tr>
<td>6 questions (Network analyses)</td>
<td></td>
<td>- After: 70%</td>
<td></td>
</tr>
<tr>
<td>Interviews with key people</td>
<td>Once in the beginning (after e-tool questionnaire)</td>
<td>30 people – ‘gate keepers’ based on network analyses, or volunteers</td>
<td>To collect data on NCR’ team structures; and collaboration and interaction between the teams</td>
</tr>
<tr>
<td>Photo survey</td>
<td>Beginning</td>
<td>NCR staff was asked to take photos of things such as: their likes and dislikes, comfortable areas, places to meet etc.</td>
<td>To collect data on how people perceive their current environment</td>
</tr>
<tr>
<td>Shadowing</td>
<td>Beginning</td>
<td>Georgeson’s observations</td>
<td>To collect data on how spaces used</td>
</tr>
<tr>
<td>Post interviews</td>
<td>6 month later</td>
<td>12% population (approx. 60) representing all groups in Discovery centre – sample group identified from network analyses (key gate keepers)</td>
<td>15 key issues addressed, relating to: accessibility, communication knowledge sharing, pride productivity, diversity of settings easiness, satisfaction</td>
</tr>
</tbody>
</table>

Table 3 Data collection methods and purpose

¹ Part of the e-tool questionnaire, involving 3 parts and approximately 112 questions
4.7.6 Defining the workplace needs - the business aims

From the ‘Business Dynamic Cards’ it could be defined that the ‘innovation’ was the main business driver, ‘decision-making’ was to be improved the most and that the ‘Work processes’ needed the least improvement and was also ranked to be doing the best out of five dynamics.

From the leadership interviews Georgeson identified some key issues, which enabled to define the goals for the project in more detail. The following table shows some examples of these issues and goals:

<table>
<thead>
<tr>
<th>Leadership comments</th>
<th>Georgeson’s interpretations of goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Culture</strong></td>
<td>- Manufacturing mentality</td>
</tr>
<tr>
<td></td>
<td>- Clock watching</td>
</tr>
<tr>
<td></td>
<td>- Cost as a measure of efficiency</td>
</tr>
<tr>
<td></td>
<td>- Schedule takes over quality</td>
</tr>
<tr>
<td></td>
<td>- People key to success</td>
</tr>
<tr>
<td></td>
<td>- Culture can work against change</td>
</tr>
<tr>
<td></td>
<td>- Innovation needs to be recognised</td>
</tr>
<tr>
<td></td>
<td>- Flexi time needs to be business focused</td>
</tr>
<tr>
<td></td>
<td>- Need to show employees they are valued</td>
</tr>
<tr>
<td></td>
<td>- Culture need to be understood leveraged in the new building</td>
</tr>
<tr>
<td><strong>Organisation</strong></td>
<td>- Hierarchical</td>
</tr>
<tr>
<td></td>
<td>- Cross team working</td>
</tr>
<tr>
<td></td>
<td>- Teams change often</td>
</tr>
<tr>
<td></td>
<td>- Need to consider functional v cross functional organisation</td>
</tr>
<tr>
<td></td>
<td>- Need to consider hierarchy and networks in spatial solutions</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>- Current space is restricted</td>
</tr>
<tr>
<td></td>
<td>- Poor flow of communication from bottom to top</td>
</tr>
<tr>
<td></td>
<td>- Close links to other sites needed</td>
</tr>
<tr>
<td></td>
<td>- Need to provide spaces that encourage better communication</td>
</tr>
<tr>
<td></td>
<td>- Technology will be used to link the separate buildings</td>
</tr>
<tr>
<td></td>
<td>- Need to provide flexibility</td>
</tr>
<tr>
<td><strong>Work processes</strong></td>
<td>- Cross functionality to support team working</td>
</tr>
<tr>
<td></td>
<td>- Process times must be shortened</td>
</tr>
<tr>
<td></td>
<td>- No time for creativity</td>
</tr>
<tr>
<td></td>
<td>- Inefficient circulation</td>
</tr>
<tr>
<td></td>
<td>- Team working benefits from dedicated spaces and flexibility</td>
</tr>
<tr>
<td></td>
<td>- New spaces will be designed to foster creativity</td>
</tr>
<tr>
<td></td>
<td>- Appropriate technologies and HR activities must be enacted</td>
</tr>
<tr>
<td><strong>Innovation</strong></td>
<td>- Inefficient</td>
</tr>
<tr>
<td></td>
<td>- Lack of creativity</td>
</tr>
<tr>
<td></td>
<td>- Manufacturing legacy is a barrier</td>
</tr>
<tr>
<td></td>
<td>- Speed to market is main factor of success</td>
</tr>
<tr>
<td></td>
<td>- Spatial solutions to enhance innovation</td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td>- Lack of desire to learn</td>
</tr>
<tr>
<td></td>
<td>- Knowledge held by individuals</td>
</tr>
<tr>
<td></td>
<td>- Two way learning and open communication will develop intellectual capital</td>
</tr>
<tr>
<td><strong>Attract and retain</strong></td>
<td>- Need to pay more to retain staff</td>
</tr>
<tr>
<td></td>
<td>- Need to attract graduates</td>
</tr>
<tr>
<td></td>
<td>- New building should say ‘our people matter’</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>- Lack of infrastructure to support multiple locations</td>
</tr>
<tr>
<td></td>
<td>- Systems not interactive</td>
</tr>
<tr>
<td></td>
<td>- Linking multiple locations is a key</td>
</tr>
<tr>
<td><strong>Change management</strong></td>
<td>- Need to cut meeting by 50%</td>
</tr>
<tr>
<td></td>
<td>- Informal meeting spaces considered as ‘non-working’ spaces</td>
</tr>
<tr>
<td></td>
<td>- Need to recognize teams rather than individuals</td>
</tr>
<tr>
<td></td>
<td>- Need for change management</td>
</tr>
<tr>
<td></td>
<td>- Using informal interaction to decrease meeting times</td>
</tr>
<tr>
<td></td>
<td>- Reward and recognition based on individual and team work</td>
</tr>
<tr>
<td></td>
<td>- Protocol for the new facility</td>
</tr>
<tr>
<td><strong>Trust</strong></td>
<td>- Hiding mistakes</td>
</tr>
<tr>
<td></td>
<td>- Won’t move forward unless we take risks</td>
</tr>
<tr>
<td></td>
<td>- Fears of hidden agendas relocation process</td>
</tr>
<tr>
<td></td>
<td>- Issues around risk and site closing will be addressed</td>
</tr>
</tbody>
</table>

Table 4. Issues and goals identified by Georgeson

Interviews with leadership also helped to define main objectives for the relocation. The relocation process was seen as ‘an opportunity to change the culture and space’ as well as an opportunity to ‘motivate and energise the people’. The new building was to give people ‘ownership, mobility and accountability’ and was to ‘represent NCR globally’ as a ‘world class R&D facility’.

Leadership also addressed concerns of ‘not raising expectation too high’ and the ‘equal treatment’ of different locations in Dundee. Which emphasised the need for careful management of communication.

16 Source: Georgeson presentation. Some quotations summarised.
4.7.7 Defining the workplace needs - know the user and task

In the beginning of the design process Georgeson carried out a questionnaire survey (as presented in the table 3) to find out about:

- Basic user profile data: Profile; how long with the company; How long in a current position; highest level of education completed; age group; position (supervision responsibilities)
- Activities and tools used: Work location; Tools and technology; Storage needs; Individual needs;
- Working with others: Information management pattern
- Interaction and collaborative networks: Network analyses

Through the questionnaires and other data collection, such as photo survey and shadowing, Georgeson could identify the nature of current working environment in R&D department.

The satisfaction survey showed that people perceived the space was generally moderate. However, more was clearly required form the space, as the current and desired figures differed a lot in most issues. The survey shows that the most people wanted improvement for their personal workspace, such as privacy for concentration. Acoustic problems were also to be identified, which is most likely to be reason for lack of concentration. Availability/ existences of private areas as well as team working areas were also limited.

Other identified issues concerning the spatial solutions were:
- Everybody has their own desks
- Lack of consistent structure for access, display, storage and retrieval.
- Limited availability of private areas
- Limited availability of team working areas
- Facilities were outdated, especially meeting areas
- Lack of signage makes it difficult to find people
- Lack of flexibility in the layouts
- Buckies hindered knowledge transfer (physical barrier)
- The working environment did not support co-located work
- There was a lack of appropriate space to support decision-making and knowledge sharing, which was seen to hinder work process.

Data collected about the way in which people worked showed that:
- 80 - 90% of people mainly work on the computer or talk on the phone.
- 58% of the people mainly work at their workstation,
- 30% stay in the building and
- 4-8% work outside the building and some other location.
- Informal interaction was happening in corridors
- There was isolated pockets of learning
5 WORKPLACE SOLUTIONS

5.1 Spaces provided

The R&D centre currently has various space settings. All employees have their own dedicated workstation, however, following shared spaces were created:

- Team spaces
- Decision suites
- Quiet booths
- Garages
- Restaurant
- Neighbourhoods
- Breakout areas
- Touchdown
- Formal meeting

Georgeson have indicated that instead of having permanent areas for meetings, flexible furniture allows companies to create temporary space where groups can meet, present, work on team projects. Mobile elements, for example allow people to pull together at any time to create a meeting space and reconfigure when the meeting is finished.

5.2 Protocols

Georgeson, together with the steering group, developed protocols for the use of space:

- Shared spaces are for everyone
- Private enclaves are for temporary use
- Always assume the next group to use a room will include customers
- Allow any member of the team to signal the need for privacy at their workstation or in a meeting
- Keep public postings up to date

In addition to these protocols it was emphasised that the primary requirement is to meet customer needs, not to be at your workstation all day. Therefore - ‘Be accessible if you can’t be present. If you can’t be around for an entire day, identify a backup. Change voicemail responses daily, if possible, and check for messages often. Behave the way you want others to behave around you. Working closer together demands co-operation.’

5.3 Support services in place

The support services in place at the Gourdie Factory were expanded to the Discovery Centre. Therefore, there were no special criteria developed for selecting support services for the Discovery Centre and staff had no impact in selection of support services. The services provided are as described in the section 2.6.2.

Recording and monitoring: Service Level Agreements (SLA) are included in the security, cleaning and catering contracts. However, the SLA’s are very much based on the expected activity rather than outcome or quality based. (Outsourced Facilities Management is expected to develop SLA’s further)

Other than SLA’s, there is no formal mechanism to record support services in place. Helpdesk deal with the enquiries and complaints, but there is no formal recording or monitoring of this.

17 Georgeson presentation
NCR was going to carry out a customer satisfaction survey in the canteen to cover the areas of hygiene, cleanliness, choice, and value for money, to enable to charter and measure these numerically. This would have helped to identify, for example, top five favourite meals. The idea was to take a cross selection of employees, around 40-50 people, to complete the survey once a week, for certain period of time. Positive survey results would have been meaningful data when there are claims of deteriorated catering services. This survey, however, has not taken place due to lack of time and money.

Service Providers themselves do not have formal mechanisms for customer satisfaction surveys. Catering services, however, carry out satisfaction surveys from time to time.

5.4 Workplace processes in place

Some workplace processes could be identified through the interview (Oct 2003):

Business and FM: Steering group, which was formed for the relocation project, was to meet regularly with the Facilities Management to raise issues within the working environment and to make sure the facility met the expectations.

Village Bobbies: Some members of the steering group were selected as ‘village bobbies’ to occasionally tour around a dedicated area and monitor the cleanliness and tidiness and report back to Facilities Management of identified problems.

Internal moves: Initially it was set up so that the business managers or the ‘Village Bobbies’ were to be responsible of managing the desk moves. Managers were to discuss amongst themselves how to relocate teams of individual members of teams and when possible move the desks around or then contact Facilities Management to carry out bigger physical moves.

Facilities Survey: NCR has a global Facilities Survey, which measures satisfaction with the building services; Building Appearance and Image; Business Support Services; and Facilities Management Services performance. Part of the CbP the assessment of the workplace solutions was carried out (using CbP questionnaire) since then there has been no measurement of user satisfaction with the working environment taken place.

5.5 Success of the workplace solutions

As a part of the Community based Planning, Georgeson carried out surveys and measurements of the business dynamics and the user satisfaction. These were both carried out before and after the relocation, which enabled comparison with results and indication of admired improvement.

5.5.1 Business dynamics

NCR assessed business dynamics before the move as followed:
- Innovation was the main business driver
- Decision-making was to be improved the most
- Work processes needed the least improvements and were also ranked to be doing the best out of five dynamics.

The results after the relocation was as follows:
- Innovation had increased by 50%
- Learning had increased by 75%
- Communication had increased by 14%
- Decision-making had increased by 150%
- Work processes had increased by 14%

5.5.2 Satisfaction

The satisfaction questionnaire, carried out before the relocation was repeated six months after the relocation, with 70% response rate. Also interviews with 12% of staff (approx. 60 people who had been identified as ‘gate keepers’ in the network analyses) were carried out. The sample group represented all groups in the Discovery Centre.
Instead of presenting the post questionnaire results directly in comparison with the pre-occupancy survey, the key issues from both, questionnaire and interviews were identified and presented to NCR. The following satisfaction rates were identified:

1. Increased face-to-face interaction and informal communication (decrease on formal communication and email activity) 100 %
2. Restaurant used as a hub of activity throughout the day 96.2 %
3. Easier to communicate to people in own group 90.6 %
4. Better access to meeting rooms 86.8 %
5. Management and experts more accessible 86.8 %
6. Knowledge is shared more easily (positive eavesdropping, impromptu interactions, common processes) 83 %
7. Easier to accommodate and integrate visitors and consultants across neighbourhoods 79.2 %
8. Impromptu meetings helping decision making process (faster and better informed) 79.2 %
9. Workplace became a source of pride and a reference for visitors 79.2 %
10. Diversity of settings increase productivity and degree of satisfaction with the workplace 77.4 %
11. Increased team membership and identity (neighbourhoods) 75.5 %
12. Easier to network with people from other groups, speeding up decision making and knowledge sharing 73.6 %
13. Need to provide for appropriate technology in different work settings 66 %
14. Need to improve corporate information across organisation 64.2 %
15. Need to provide for training in technology and protocols for space use 64.2 %

5.5.3 Space utilisation figures

The following space utilisation figures were presented by Georgeson:

<table>
<thead>
<tr>
<th></th>
<th>Gourdie Building Oct 2000</th>
<th>Discovery Centre Building June 2002</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared Workspaces</td>
<td>4,032 sq ft</td>
<td>26,323 sq ft *</td>
<td>+ 22,291 sq ft</td>
</tr>
<tr>
<td>Percentage</td>
<td>4%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Individual workspace</td>
<td>107,794 sq ft</td>
<td>63,226 sq ft</td>
<td>- 44,568 sq ft</td>
</tr>
<tr>
<td>Percentage</td>
<td>96%</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>Total AREA</td>
<td>111,826 sq ft</td>
<td>89,549 sq ft</td>
<td>- 22,277 sq ft</td>
</tr>
<tr>
<td>Occupants</td>
<td>486</td>
<td>486</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>184 sq ft / person</td>
<td>130 sq ft / person</td>
<td>- 54 sq ft</td>
</tr>
</tbody>
</table>

* FIXED: Conference rooms, Decision Suites, Quiet Booths, Restaurant = 16,301 sq ft
FLUID: Breakout, Team spaces, Design Studio = 10,022 sq ft

5.5.4 Success of the relocation process

It was perceived that the balance of staff involvement and communication was successful: ‘The whole process was successful: everybody was engaged, the steering committee was set up, and there was regular communication, both to the team and wider audience. Overall the project was driven in a very logical manner’ 18

Georgeson was involved in the project 1.5 years before the move, and therefore, there was plenty of time to engage staff and therefore time for change management.

There was, however, some resistance towards the change: ‘The relocation was a learning experience for NCR and perhaps, a few people did not see the value of this.’ 19 The resistance of staff was generally perceived as a minor barrier in the project. In the beginning of the project, the staff was

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18 Ray Robertson (Oct 2003)
19 Ray Robertson (Oct 2003)
more concerned of the seating arrangements, than focusing on the process of improving the functions of working.\textsuperscript{20} Middle management was also concerned about the new ways of working, especially working in the open plan office. Therefore presentations were organised for managers to help them to understand the benefits of the new ways of working.

It was also perceived that: ‘It took a long time to get people engaged, because they were use to the old approach where they weren’t asked for their needs. They also didn’t directly see the value of their input. But when the time went on they realised that there was a huge benefit in having an input to what environment they were going to be located in.’\textsuperscript{21}

Budget also become as a barrier towards the end of the project. Initially a fitness Centre was planned to be built, but due to lack of money, this could not been built.

The budget was also a barrier in the further staff relocation to the Discovery Centre (After the major move from the Gourdie Factory facilities) following the consolidation of locations. Due to lack of money, the village-concept of Discovery Centre could not be adapted to the top floor of the building. Instead old furniture, and therefore, the old layouts were provided.

### 5.5.5 Findings from the interviews (Oct 2003)

Additional to the data collected through NCR and Georgeson, interviews with the key people\textsuperscript{22} were carried out (Oct 2003) to understand the current state of the workplace processes (after the CbP process was completed). The following feedback was gained through these interviews:

**No formal communication between FM and business.**

Before the move to the building the steering group (including FM) met weekly, but during the occupation FM met with the steering group, at first every fortnight, but a couple of months later this went up to monthly meetings and finally these meetings faced out when enough was perceived to be done to support businesses day-to-day activities.

As a part of this activity FM made Walk throughs with the Management (mainly with members of the steering group) to make sure the facilities met the expectations. This however also faced out, due to mutual lack of organising this – either Facilities or the business haven’t initiated to meet since.

The initially the people who were selected as ‘village bobbies’ (members of a steering group) were meant to make those tours in the areas allocated for them and make sure it was all clean and tidy and if necessary approach FM with suggestions for improvements. Some of this happened in the beginning to achieve the satisfactory environment, but once this was achieved, the activity stopped.

It was suggested in the interviews, that ‘there is a need for a more formal process signed off by the business which should have improved communication at its core’.

The internal ‘spotlight magazine’ in which the progress of and comments about of the relocation process was reported was stopped soon after the relocation.

The helpdesk is the only communication method (in addition to informal ad-hoc discussions).

**No formal process for office moves:** The teams within the R&D activities change regularly and therefore there is a frequent need for restructuring office layouts. Although the intention was that the ‘village bobbies’ or the management were to initiate and plan the internal moves amongst the teams and carry out minor desk moves themselves, the Facilities Management have been called to make most of the moves.

From the business management point of view it was indicated that it is difficult to co-ordinate the moves between the teams and that there would be a need for somebody to facilitate the moves process in such a way that it was fair to everybody and so that a valid business case for relocations was presented. It was also suggested that the business sees space moves as facilities logistics and

\textsuperscript{20} Georgeson (Oct 2003)
\textsuperscript{21} Ray Robertson (Oct 2003)
\textsuperscript{22} Designer/consultant, Business Unit Manager, current FM director and FM directo during the relocation
not as part of their core business. Perhaps, business should take an ownership of the moves, however support from Facilities Management, as a facilitator, would be greatly appreciated.

Protection of team spaces: It was suggested that the lack of organised office moves had lead some feel that the office moves were sometimes unfair and management had also started to be very protective about the space allocated to their teams.

Involving staff to decision-making:
Since the relocation, there have been no workplace projects, in which staff would have been engaged in such a volume as in the R&D relocation project.

After the major R&D relocation from the Gourdie Factory to the Discovery Centre, some space was left free for further relocation of staff from another NCR site. These people were not involved in the CbP process and did not therefore participate in the change process. Due to lack of funding this part of the Discovery Centre is provided with the old ‘three person buckies’ as in the previous office facilities in the Gourdie Factory.

It was recognised that it would have been nice to be able to carry out a similar process of involvement in this relocation project as well, but due to lack of money to be invested in this there were clear limitations of choice in layouts and furniture to be provided. Therefore, it was perceived that there was no point in engaging the staff to this project.

Generally the principle and benefits of staff involvement were recognised by the Head of Facilities Management as: ‘From people involvement point of view we are happy to involve them in space improvements, but we also want them to get involve from an engineering point of view and very little is done from a satisfaction view.’

 Appropriateness: It was suggested that the majority of staff feel that the current working environment is appropriate for their needs and open plan is preferred rather than separating walls. Some staff would, however, often prefer the old office arrangement, where they had private offices.

On the other hand it was perceived that following the further move of staff (where old kind of environment was provided, as described above), there was a variation of opinions about the different work settings in the Discovery Centre. ‘Other people in Discovery Centre complained that the building was suppose to be open plan, and that they did not have an opportunity to use the ‘old-kind’ of environment used in 3rd floor. Some of the people, who moved to the 3rd floor, complained that they wanted open plan as in the rest of the building.’

Adaptability: Despite the problems with the internal office moves it was suggested that the office space is generally very adaptable. Some adaptation had already been done, for example HR department is being provided with more privacy by putting up partitioning walls.

Most of the shared spaces are used as intended. However, some of the ad-hoc meeting areas have been taken over for project working. A few meeting cubicles have also been taken over by management, which has been perceived justifiable, due to frequency of meetings and need for privacy. It was suggested that generally this has not seen to be causing any problems amongst the staff.

Flexibility: It was perceived, through the interviews, that the office space was flexible to accommodate different activities: There are plenty of different space settings available, the furniture is easily movable, IT cables are on the fixed platform and some of the rooms can be divided according to different needs.

It was also perceived (by FM) that the Discovery Centre, however it is flexible, requires a lot of FM’s resources (people and time) to move things around.

Learnability: It was perceived that people learnt to use the space fairly soon after the relocation. There has been no need to educate people since, because people generally seem to know how to use the space. For new staff there is no formal introduction to how the space is used. This usually happens informally via peers.
Referring to the use of the staff restaurant it was seen that people quickly adopted the idea of having informal meetings in these facilities instead of formal meeting areas. This idea was also quickly spread to the canteen in the Gourdie Factory, which had been refurbished at the same time Discovery Centre was built.

The one thing that people have not learnt perhaps that well is the room booking system, which does not seem to work very well - rooms are booked, but then not used.

**Efficiency:** Concerning the measurement of improved task completion it was suggested (from business point of view) that there have been too many other changes taken place which means that it is not possible to attribute any improvement in deadlines to the facility change alone. Therefore, it cannot be shown that business performance in the new location has improved.

From the facilities management point of view it was also perceived that the measurement of efficiency is difficult: ‘It is very difficult to measure office effectiveness and to demonstrate that certain layouts, such ones in Discovery, has increased the input.’

However, in the past a Business Unit Manager had recognised that in the Discovery Centre the same job was done with 20% less people. It was perceived, by Facilities Management that ‘this could be a reasonable measure but its effectiveness could be questioned’

Instead the Head of the Facilities Management was keen to measure changes in the manufacturing environment, where the outcome could be easily measured through units produced: ‘Would be very interesting see what impact facilities, such as tea and coffee bar, more comfortable chairs and higher quality flooring would have on increased output. In these facilities, we could measure improvement in more quantitative ways, for example, if the yield is the same but production of units increases. This would be more effective measure, where as efficiency is more difficult to measure’