

Proving Collaboration Pays Study Report

NCCTP

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1. Introduction

Despite its fairly conservative nature an increasingly significant proportion of the construction industry has come to adopt collaboration technologies in recent years.

However, the technology is still not being used by the entire industry on every project. There remains a significant number of organisations that would benefit from using such technology but who are, nevertheless, reluctant to employ it.

As is often the case with newer technology, a major barrier relates to the doubts that many potential users have regarding the practical usefulness of the technology. These people may be highly sceptical about what such technology could do for them. What exactly will the benefits be? Can the benefits be precisely quantified? How can customers be certain that this technology will do what the suppliers claim? All these kinds of questions represent key barriers that inhibit future market growth.

One way in which suppliers have sought to overcome these barriers has been to provide prospects with case study information. However, whilst this information can be a valuable way of illustrating possible benefits, sceptical prospects might feel that the case studies simply represent a hand picked group of successes rather than a representative picture of the experiences of all users. Case study information, useful as it might be, will nevertheless continue to be viewed as anecdotal and selective by many people.

For this reason the NCCTP commissioned Benchmark Research Ltd to conduct an objective survey of customer experiences. The aim of the study being to provide a representative, quantifiable measure of the various different benefits identified by people with first hand experience of using collaboration technology on live projects. Thus providing, for the first time, objective facts and figures that NCCTP members can then present back to potential users and thereby accelerate the uptake of the technology.

This reports details the findings from this research.

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2. Methodology

The research study consisted of 272 telephone interviews with end users of collaboration technology. Interviewing was conducted during the latter part of April and May 2006 (a copy of the questionnaire can be found in the appendix of this report).

Respondents were identified and interviewed from lists of recent customers provided by the following NCCTP members:

- *4Projects,*
- *Aconex,*
- *Asite,*
- *BIW Technologies,*
- *Business Collaborator,*
- *Cadweb,*
- *Causeway Technologies*
- *Sarcophagus*

The final sample therefore represents the views of a wide mix of people with experience of using the technology provided by these different suppliers.

The 272 interviews were divided as follows between the following segments:

• Main contractors, project managers, construction managers	=	69
• Sub-contractors and suppliers	=	64
• Designers (civil engineers or architects)	=	73
• Quantity Surveyors	=	32
• Client organisations	=	34

Overall, lists of 1,527 names were provided, out of which 183 specifically refused to participate in the survey and 272 completed a questionnaire. Thus the survey generated an overall response rate of 60% and would represent 18% of the original sample lists.

The 1,527 individuals on the original list were drawn from 759 different companies. The 272 completed interviews were drawn from 195 of these companies. Therefore we managed to interview at least one respondent from 26% of the companies on the original sample list.

The respondents varied in terms of the degree of experience they had in using the technology. 39% said that they had made use of collaboration technology on just one or two projects and, at the other extreme, 32% had used it on numerous projects. The remaining 29% had used it either on "just a few" (11%) or "several" (18%) projects. Therefore the overall sample would contain a mixture of users from highly experienced users to relative novices.

3. Executive Summary

- Overall, 96% of people that have made use of collaboration technology are happy that it has benefited their business. All of these people are likely to re-use the technology on future projects.
- 52% are highly committed to using the technology and plan to make significant use of it in most, if not all, future projects.
- Many commissioning clients (three quarters) were found to have a distinct preference for working with contractors/suppliers that had experience of using collaboration technology. Supplier/contractors recognise the fact that these preferences exist and believe that their ability to work with such technology is essential if they wish to bid successfully for certain projects with larger clients. Over 80% of contractors/suppliers believe that larger clients are increasingly moving in the direction of insisting that people who work with them are proficient in using this technology.
- Over 80% of the 272 users of the technology we spoke with highlighted a number of ways in which they felt the technology had delivered substantial business benefits, these were:
 - In enabling them to access documents 24/7
 - In ensuring that project management information was available to everyone centrally.
 - In cutting the amount of money spent on post and on couriers.
 - In reducing the chance that important documents might be lost.
 - In providing a better overall audit trail.
- Furthermore, over 70% felt that they had experienced substantial benefits in terms of the following:
 - Better traceability/visibility of documentation.
 - Improved information security.
 - Reduced costs associated with distribution/production of documents.
 - Better accountability for all parties involved in the project.
 - Improved ability to easily find archived information quickly.
 - Reduced need for storage space for documentation at the end of the project.
- And the following benefits were regarded as substantial by at least two thirds of all users:
 - Less confusion over which version of any given document is the current one.
 - Greater confidence that everyone is working with the same version of a document.
 - Enabling geographically dispersed teams to work together on a project much more effectively.
 - Making it easier to find and retrieve the right document.
 - Providing a better & more complete archive of Health & Safety information at the hand-over stage.

- It was noted that some users were clearly experienced more significant business benefits in certain areas than others. There may be a number of reasons why these people displayed more positive user experiences but we can only speculate. These include:
 - Because they faced more significant challenges/problems prior to using the technology than other users and the technology had therefore benefited them more in terms of addressing these particular challenges.
 - The nature of the work they were undertaking benefited from specific aspects/advantages offered by the technology – for example, if they worked more frequently with geographically dispersed teams than other users.
 - The mix of technologies they had selected/used provided a better match to their business needs than had been the case with other users.
 - The way in which they had used the technology had provided them with advantages over other users – perhaps because they had a clearer vision of how they wanted to employ it, what specific benefits they wanted to achieve and/or had developed a better implementation strategy.
 - They had a greater influence than other users over the selection of the technology and therefore were better placed to ensure that the technology supplier selected was best matched to their own particular needs.
- Comparisons with a similar study by Harvard (also published in 2006) reveals a similar pattern of opinion for those instances where a direct comparison is possible. In particular, both pieces of research reveal that benefits in terms of audit trail and greater access to data/information are seen as key areas where the technology has helped.

4. Satisfaction with the Technology Itself

Firstly, we asked respondents to say how satisfied they were with the technology itself in terms of its actual technical performance, the supporting services provided by the supplier and general user experiences. This leaves to one side the issue of business benefits and focuses purely on the extent to which the technology was perceived to be able to perform the tasks it was suppose to do from a technical point of view.

Respondents were asked to provide a satisfaction score for various different attributes. In each case they were asked to give marks out of 5, where 5 out of 5 represented the highest possible level of satisfaction and a score of just 1 indicated a high degree of dissatisfaction. On this basis we can say that a score of 4 or 5 is very positive, representing high satisfaction. A score of 1 or 2, by contract, would represent a low score, with 3 representing a moderate mid-point. Figure 1 shows a summary of the results.

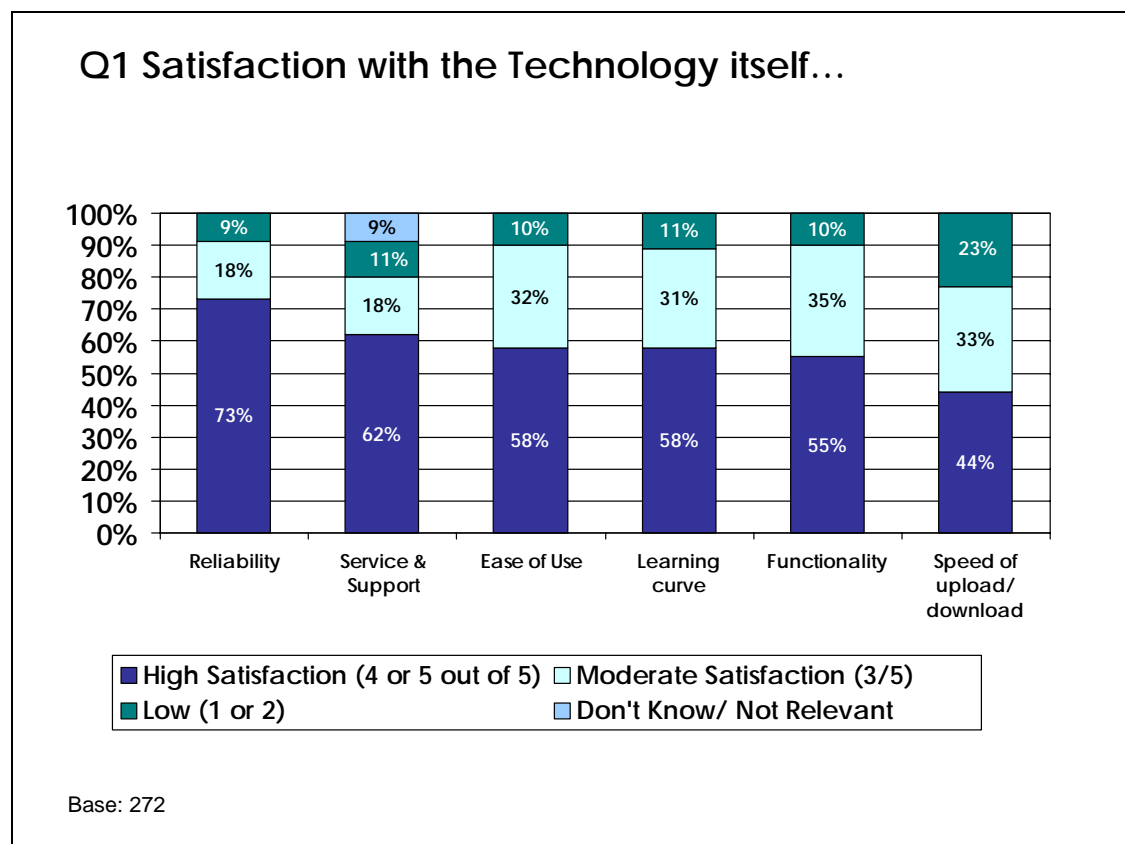


Figure 1

Generally speaking satisfaction with the technology itself is very positive. Only a minority of people are unhappy with any given aspect of it. The strongest common feature is that the technology is seen to be highly reliable. The only area of slight concern rests with the speed of uploads/downloads – but even here the proportion of people with high satisfaction outnumbers those providing a low score.

As regards the speed of upload/download the performance will be dependent to a significant degree on the IT infrastructure of the end-user. Users with good infrastructure and fast internet connections will benefit from faster upload/download times than those without. 51% of the most experienced users (those who have used the technology on at least “several” different projects) were actually highly satisfied with the upload/download times – contrast this with just 36% for those who had only used the technology on a few projects. This difference might be because they had better IT infrastructure to begin with, or, it might be because their experiences have led them to upgrade their own IT in order to improve the upload/download times.

It is also worth noting the small but significant number of respondents that were unable to comment on “service and support” – presumably this is because they’ve never used supporting services from suppliers.

5. Overall Level of Commitment to Collaboration Technology

We asked respondents a series of questions designed to measure the level of their overall commitment to collaboration technology. By so doing, we aimed to develop an overall measure of the proportion of users that could be described as “loyal” and therefore highly committed to using the technology again on future projects.

In the first in this series of questions, respondents were asked to say whether they would recommend the technology to a colleague or peer. Almost exactly half of all users are at least extremely likely to recommend and, indeed, only 11% expressed reluctance to do so as figure 2 shows.

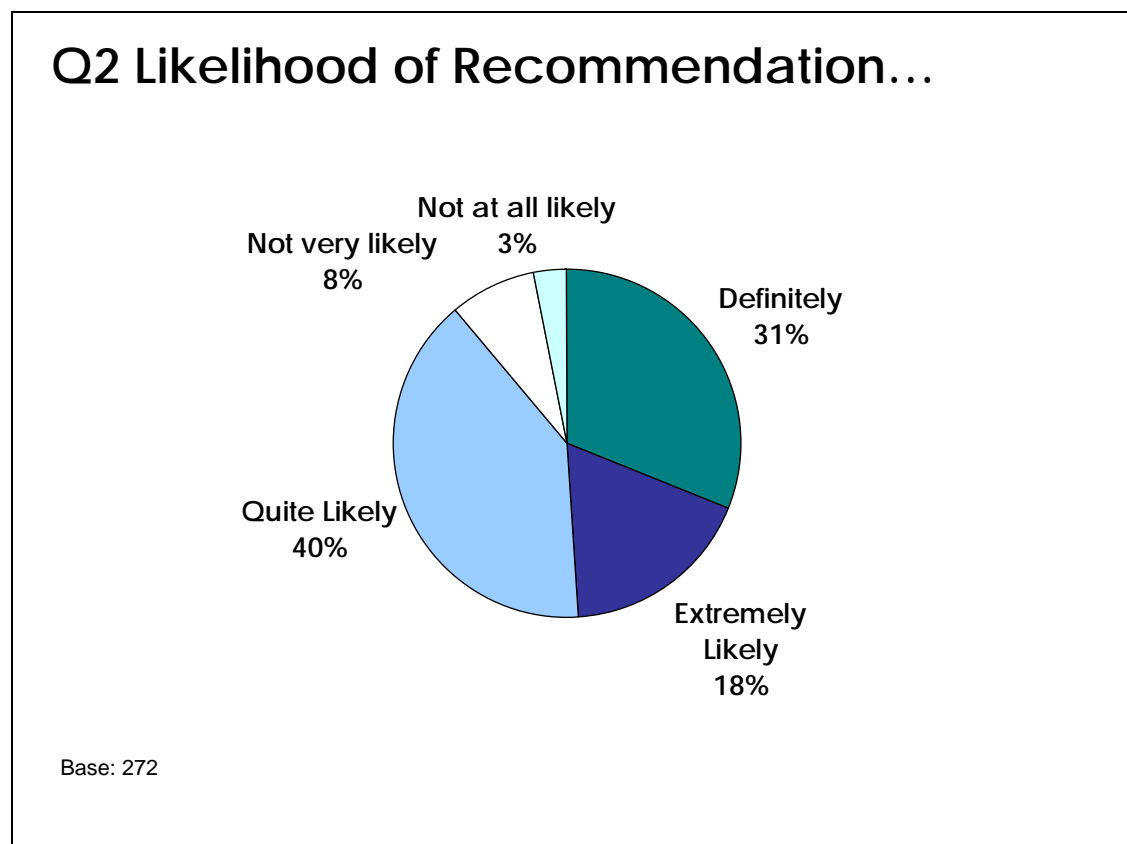
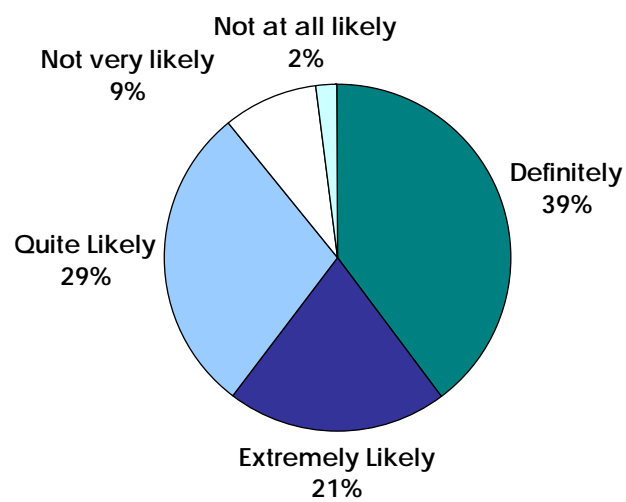


Figure 2

In terms of the likelihood of re-use, 60% are at least extremely likely to use the technology in future. Indeed, only 11% expressed reservations (figure 3).

Q3 Likelihood of Using Again...

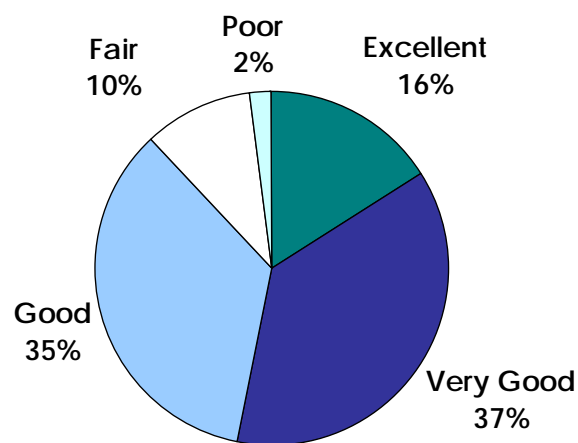


Base: 272

Figure 3

Only 2% feel that, overall, the technology performed poorly with over half perceiving performance levels to be very good or excellent (figure 4).

Q4 Perception of Overall Performance...

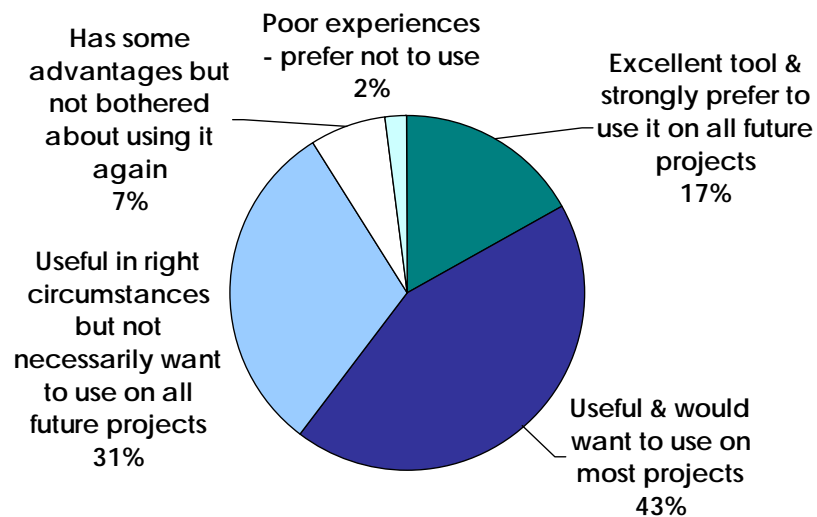


Base: 272

Figure 4

Question 5 provides us with perhaps the best indication of user attitudes to the technology. 17% are enthusiastically committed to the technology and say they would strongly prefer to use it on all future projects. At the other extreme just 2% say that their experiences of the technology were poor and that they would prefer not to use it again in the future.

Q5 Stated Attitude to the Technology...



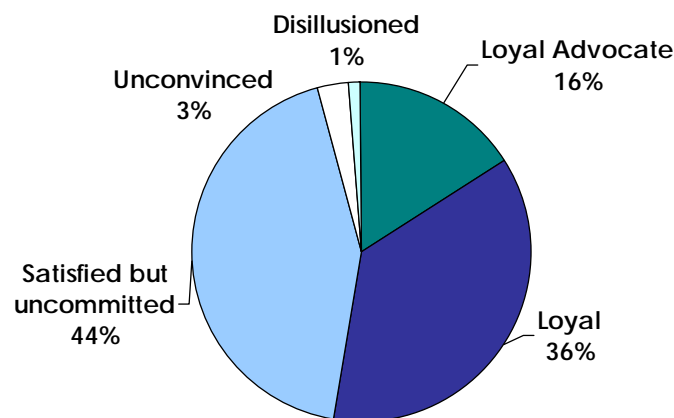
Base: 272

Figure 5

By analysing the results of Q2 to Q5 in combination it is possible to establish a measure of the overall **depth of commitment** that each user feels towards the technology. Figure 6 shows the results from this analysis, which should be interpreted as follows:

- Loyal Advocates = strongly committed to using the technology and also very likely to promote the use of the technology to others in a proactive manner.
- Loyal = strongly committed to using the technology on future projects but less likely to proactively evangelise.
- Satisfied but uncommitted = users that are essentially happy with the technology and reasonably likely to wish to use it again in the future BUT who are not so committed to collaborative technology that they would regard future re-use on every project as an automatic choice.
- Unconvinced = users who are essentially unsure as to whether the technology is worthwhile or not. These people may feel that there are both advantages and disadvantages in using this technology but are not able to easily say as to whether one would outweigh the other.
- Disillusioned = users who have had unhappy experiences with the technology and, consequently, prefer not to use it again.

Depth of Commitment...



Base: 272

Figure 6

On a positive note, figure 6 shows that the proportion that are unconvinced or disillusioned is very low indeed (only 4%). This means that 96% of users are essentially happy with the technology and, slightly over half are actually very highly committed to using it in the future. The only potential concern lies in the high proportion of organisations that, whilst generally satisfied, do not necessarily see using this technology on future projects as being an automatic choice. One important future challenge for the NCCTP will be to convert these people into loyal and committed users.

There is a difference between the levels of loyalty measured amongst experienced users and those that have used the technology on only a few projects so far as figure 7 shows.

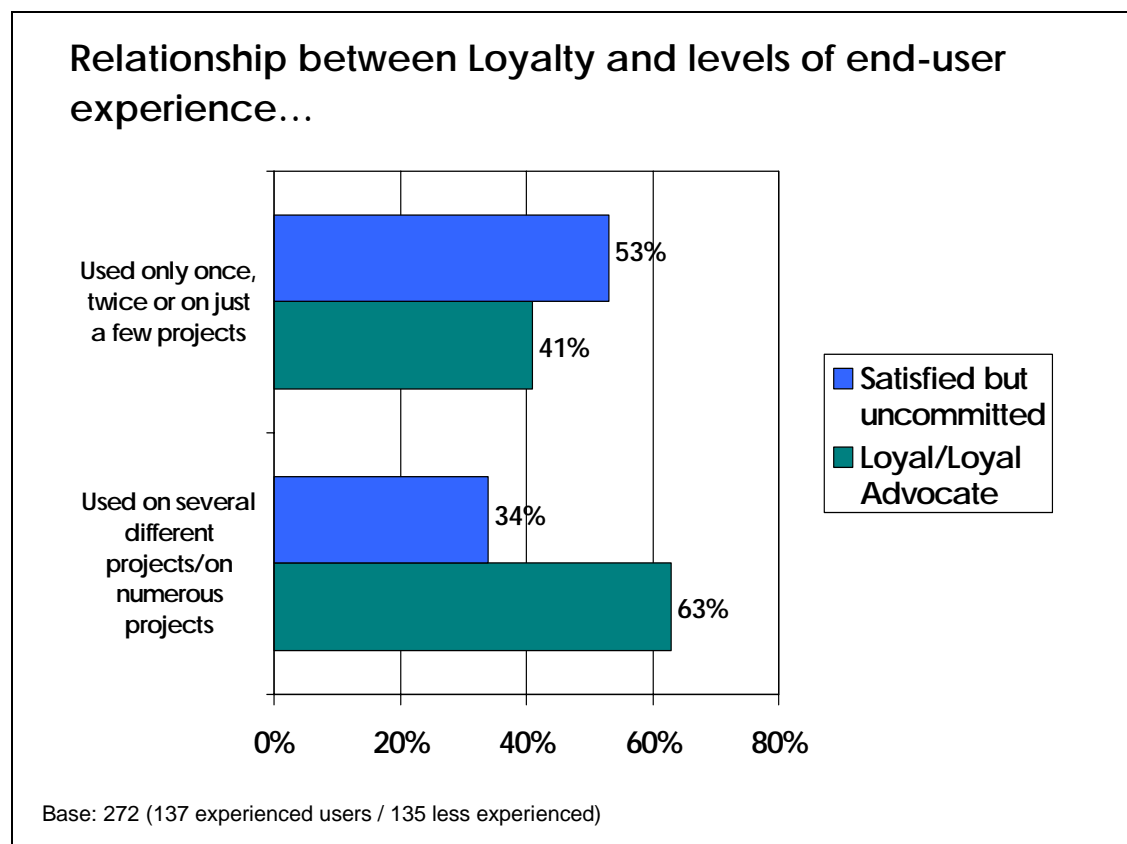


Figure 7

The primary difference is that experienced users are more likely to be loyal, whereas those that have only used the technology on a more limited number of occasions are more likely to be "satisfied but uncommitted". But, are more experienced users more loyal because they are able to get more out of the technology or are they more experienced because

they are loyal? Whilst there is clearly a correlation it is difficult to be certain as to which causes which. Nevertheless, it would seem clear that more frequent exposure to the technology is linked with higher levels of loyalty.

One important observation is that the overall proportion of loyal/loyal advocate users is different depending on the type of user as figure 8 demonstrates.

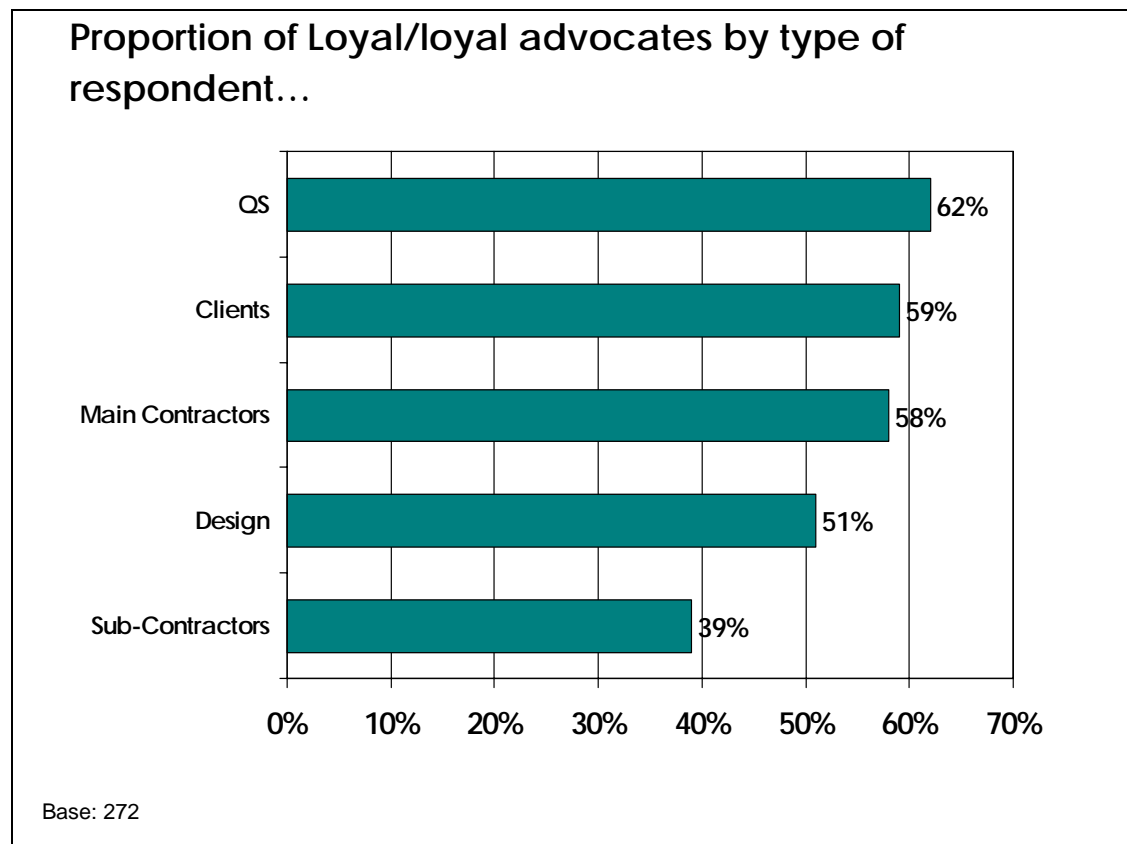


Figure 8

The highest levels of commitment are found amongst the Quantity Surveyors, Commissioning Clients and the Main Contractors. Designers appear less enthusiastic but, overall, the lowest levels of commitment can be found amongst the various sub-contractors and other suppliers. Perhaps this may reflect that the decision to use this technology is most often likely to be taken by organisations higher up the food chain – either the clients or the main contractors. Therefore, it may well be the case that many smaller sub-contractors and more peripherally engaged suppliers have less direct involvement in selecting the technology and thus feel they have less “ownership” of the decision to use it. In these circumstances it is easy to see why levels of loyalty might be lower.

Nevertheless, overall, it is clear that 96% of people that have experience of using collaboration technology feel that the benefits it brought them were sufficient to justify using it again in the future. Of course, it is useful to know how committed people are overall to the technology but this, in itself, doesn't tell us anything that specific regarding the particular benefits they have experienced. The survey therefore set out to ask a series of questions to measure exactly what kind of benefits the technology was perceived to be delivering, quantifying how many users had experienced them in each instance.

6. Benefits Brought to the Design Process

Although we interviewed 272 users of collaboration technology it should be noted that not all of these people were involved with the design phase of the project. In all 194 respondents (71%) were actively involved in this phase of project work and these people were asked to comment on the level of benefits they felt collaboration technology had brought to their business.

Once again we asked users to provide a score out of 5, where a score of 5 out of 5 represented a very substantial benefit and a score of just 1 would indicate no benefit. On this basis we might say that those users providing a score of 4 or 5 are claiming a substantial business benefit and those scoring 3 would represent a moderate benefit. Figure 9 summarises these findings against each of the various design related attributes measured.

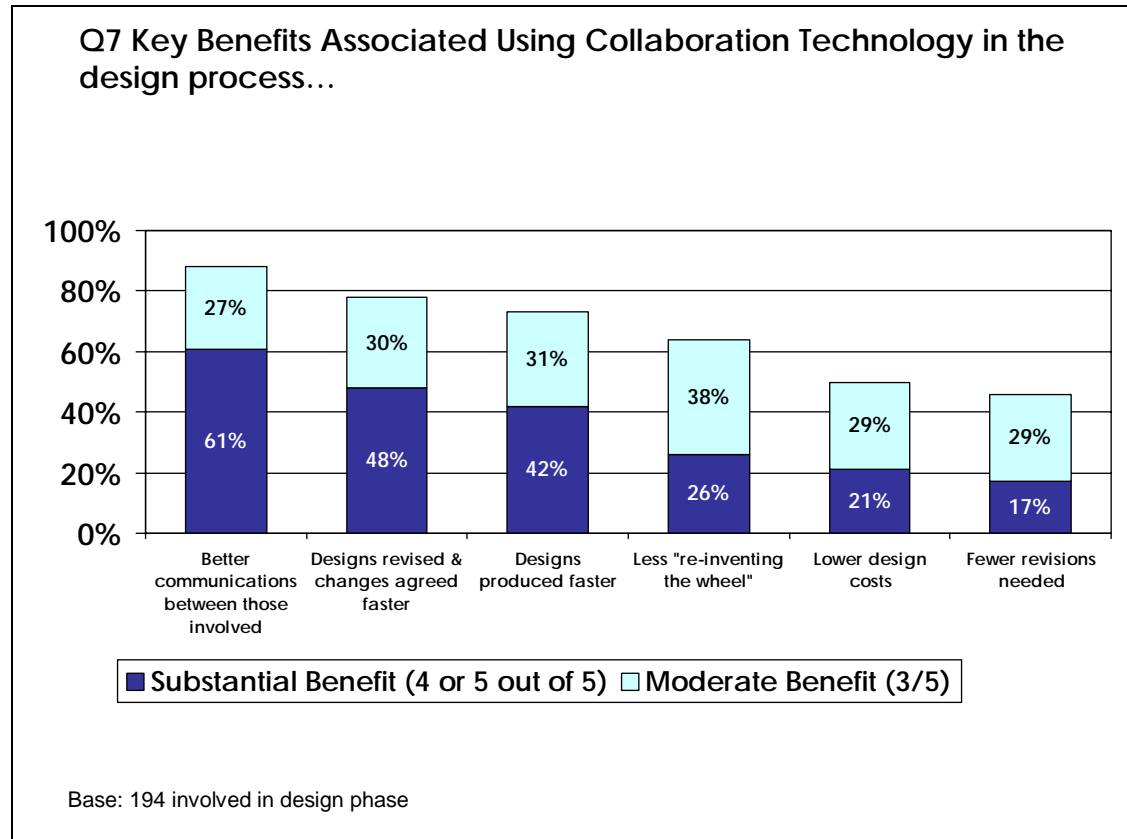


Figure 9

The area where users are by far the most likely to acknowledge a substantial benefit is in terms of the ability of the technology to improve communications between everyone involved in the design process. Here, 61% claim that the benefits their company has experienced are substantial and, if we also take account of those people who feel they have experienced moderate benefits, the proportion rises to 88%. No other benefit was identified as "substantial" by more than 50% of users, although in the case of four other factors (included reducing design costs) moderate or substantial benefits were claimed by over half.

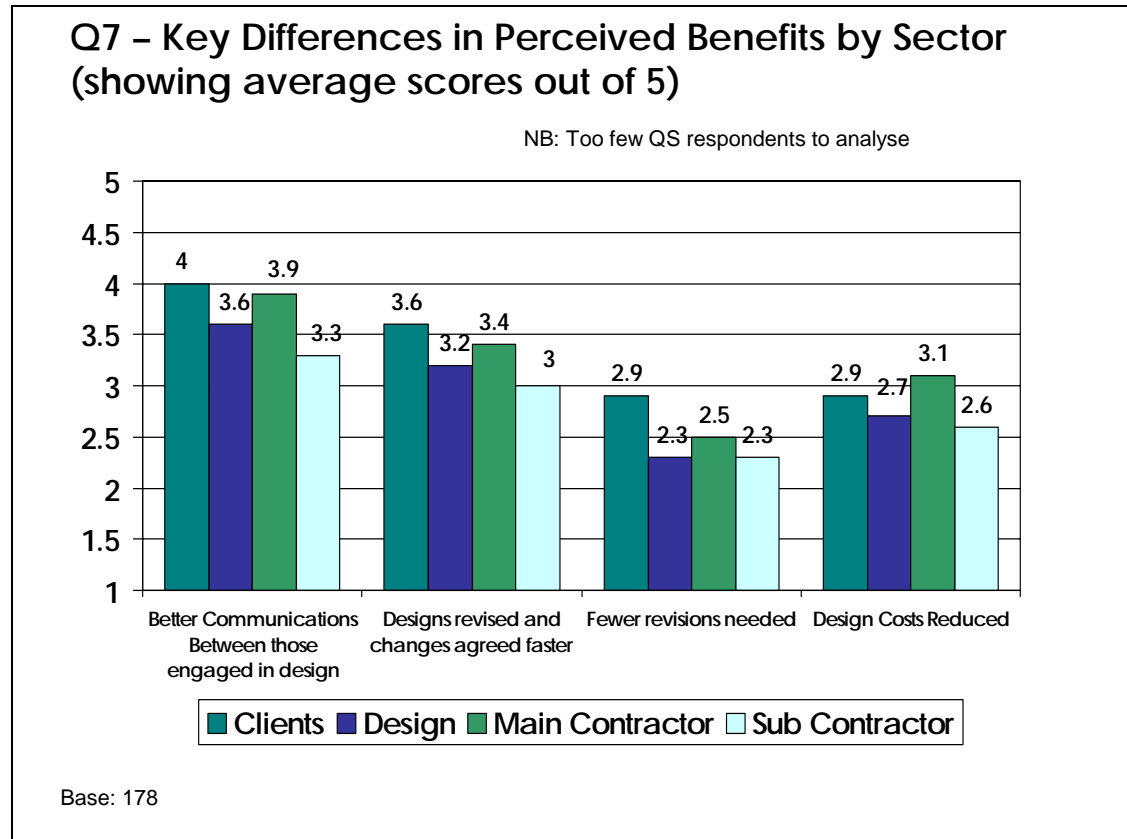


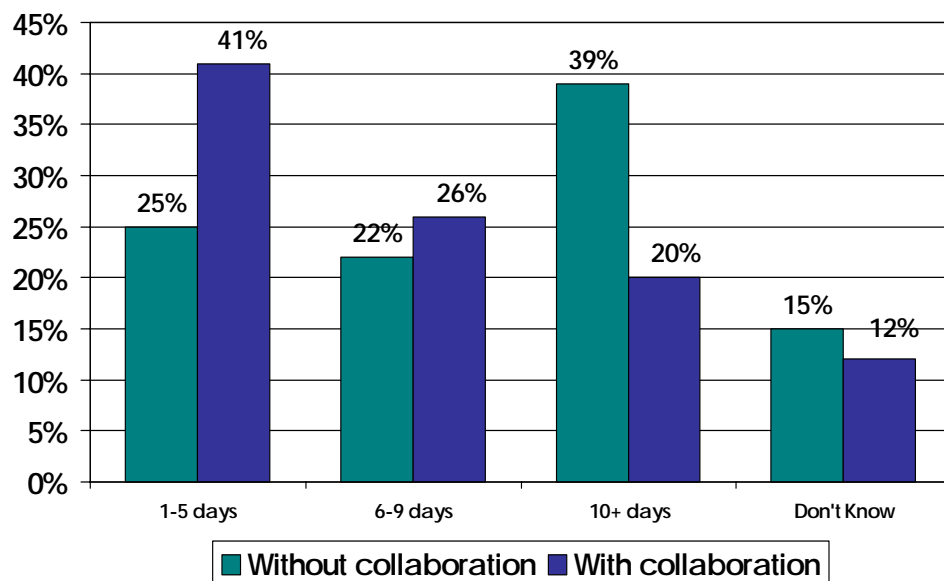
Figure 10

Some differences between various types of user were evident. It should be noted that an analysis of the opinions of Quantity Surveyors is not possible here as the total number of these people actively engaged in the design phase was fairly small. Nevertheless, an analysis of the average ratings out of 5 for the other sectors does indicate that the levels of benefits experienced by commissioning clients and main contractors were generally higher than those perceived by design companies and sub-contractors.

Little difference can be detected between the opinions of the more experienced users and those of relative novices. Both groups tend to recognise much the same kinds of benefits to the same degree. The only potential difference was found in terms of *"better communication between those engaged in design"* – here 66% of the experienced users believe the benefits were substantial, compared to 56% of the less experienced group.

One of the benefits users acknowledge to a significant extent is the ability of the technology to enable them to revise designs and get the changes agreed faster than would otherwise be the case. 78% of users believe that the technology has improved this aspect of the process to at least a moderate degree. We aimed to quantify this further by asking people to say how long, on average, they thought it would take to approve a drawing revision – when using collaboration technology and when not.

Q8a & b – Average Drawing Approval times with/without collaboration technology...



Base: 194

Figure 11

When companies used collaboration technology 41% were able to achieve approval times of under 5 days. This compares with just 25% in situations where the technology was not being used. At the other end of the scale the approval time ran to in excess of 10 days in only 20% of instances where collaboration technology was employed, contrast this with 39% of cases where traditional methods are used. The end result of this is that average approval times using collaboration technology is 6.9 days, compared to 9.3 days for situations where it isn't used – a net improvement of 26%.

Whilst the benefits acknowledged during the design phase are reasonably significant it is worth noting that a higher proportion of users identify more significant benefits in other areas of the project.

7. Benefits in Terms of Improved Traceability and Accountability

Unlike the design phase, where only a proportion of the people we spoke with were directly involved, all respondents were asked about benefits in terms of traceability and accountability.

Respondents were significantly more likely to acknowledge benefits relating to traceability and accountability than in relation to the design factors measured in the previous section. Five different factors relating to traceability and accountability were highlighted as offering a substantial business benefit by over two thirds of all respondents – not one factor scored so highly in the design process. Table 1, summarises the market's view of the key benefits delivered.

Table 1: Benefits Experienced in terms of Traceability and Accountability
Base: 272

Factor	Substantial Benefit (4 or 5 out of 5)	Moderate Benefit (3 out of 5)
Better Audit Trail	81%	12%
Better traceability/visibility of documents	79%	16%
Better accountability for all parties	73%	21%
Less confusion over which version is current	69%	17%
Ensures everyone works from same version	68%	20%
Easier to find what you want quickly	58%	24%
Helps with quality standard compliance	53%	32%
Less re-work due to using out of date information	52%	31%
Faster review/sign-off of documents	50%	32%
Less risk of litigation/disputes	37%	31%
Clear who needs to do what and when	36%	38%

Traceability, audit trail and accountability clearly represent some of the most significant benefits that collaboration technology can bring. Having said this, only a minority were willing to go so far as to claim that it substantially reduced the risk of serious disputes/litigation arising.

The extent to which the level of end user experience influenced their perceptions of the benefits was found to be limited. The most experienced users identified the same kinds of benefits to the same extent as the most inexperienced. The only area in which any real difference could be found was in terms of *"Clear who needs to do what and when"* – 40% of the most experienced users claimed this was a substantial benefit, compared to 32% of the less experienced users. It would seem, therefore, that once someone has used the

technology on just one project they will form an opinion of the potential benefits in terms of accountability and traceability that is unlikely to change.

Some differences were in evidence when different types of respondents were compared. It would seem that design companies and main contractors feel they have obtained more significant benefits than other organisations for a number of factors, as figure 12 shows.

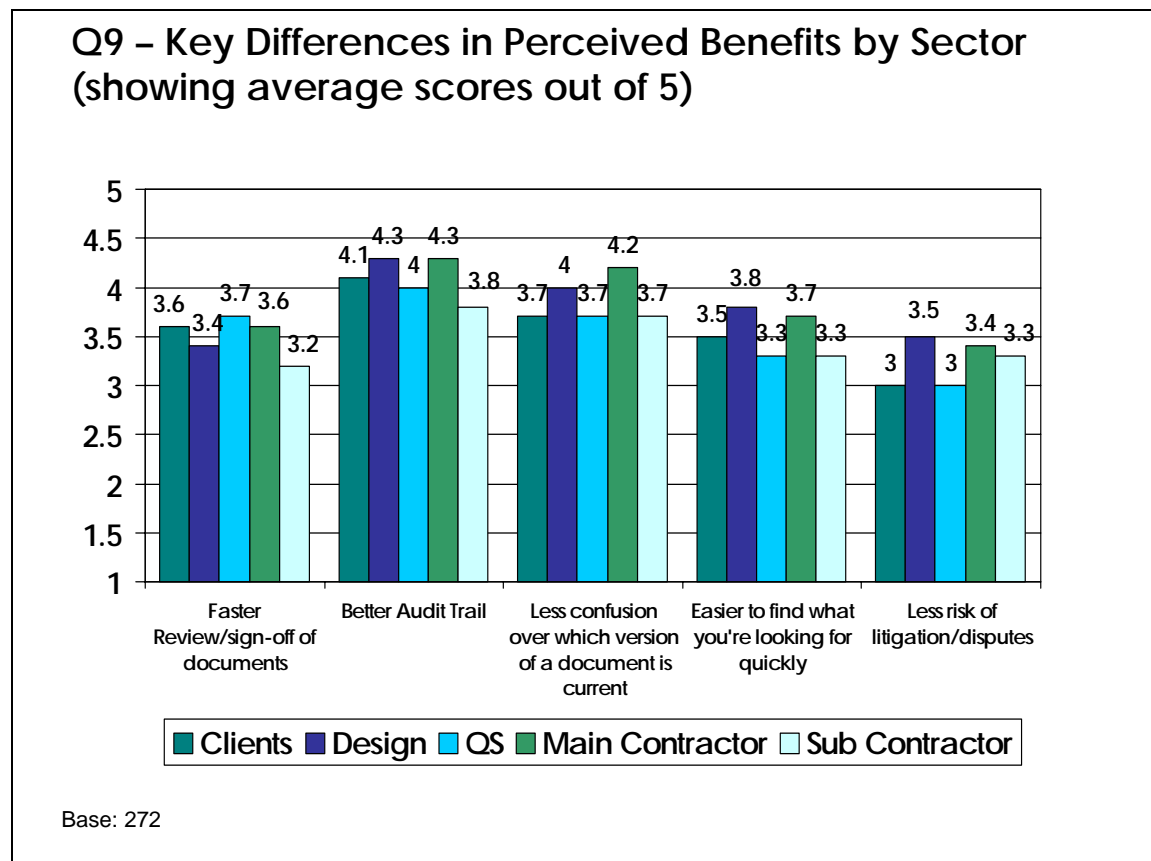


Figure 12

Contrast these findings with the scores shown on figure 10 earlier – especially with regard to the opinions of design businesses. It is clear that, even for the design businesses, the benefits experienced in terms of audit trail and traceability are thought to be far more significant than the benefits experienced in terms of design issues.

8. Benefits in terms of Project Management, Communications & Teamworking

Respondents identified three factors relating to project management that were felt to represent a substantial business benefit by more than two thirds of the sample. This would suggest a lower level of benefits experienced than was the case for traceability & accountability but still more significant than for the design process.

Table 2: Benefits Experienced in terms of Project Management, Communications and Teamworking

Base: 272

Factor	Substantial Benefit (4 or 5 out of 5)	Moderate Benefit (3 out of 5)
Project information available in central location	85%	13%
Less money spent on couriers and postage	83%	8%
Geographically dispersed teams work better together	68%	22%
Easier for smaller companies to link with large ones	63%	22%
Better Communications	60%	26%
Overall time savings	54%	30%
More key people are closely involved at an earlier stage	53%	25%
Can handle greater workload	45%	33%
Resolve problems faster	45%	33%
Better International Communications	45%	14%
Identify problems earlier	41%	35%
Can hit tighter schedules	39%	40%
Easier to set, monitor and hit Key Performance Indicators	37%	33%
Fewer phone calls needed	36%	31%
Better supplier/customer relationships	30%	40%
Overall cost savings	29%	33%
Fewer meetings needed	28%	32%
Less likely to experience project overruns	18%	38%

Two of the key benefits highlighted relate to co-ordination of geographically dispersed teams and the ability to improve the efficiency of operations for project teams that include a mixture of smaller and larger organisations. This would suggest that projects involving larger numbers of different organisations and/or which include people spread over a wider

geographic area experience the most benefits from the technology. The most attractive feature, however, would appear to be the ability of the technology to keep all project information together at a single central location – identified as a substantial business benefit by the vast majority of all users.

We found that more experienced users were more likely to say they had experienced substantial benefits in just four of the areas tested. Elsewhere the levels of benefits indicated were much the same regardless of the level of end-user experience. Figure 13 shows the key differences (where they exist) by level of end-user experience.

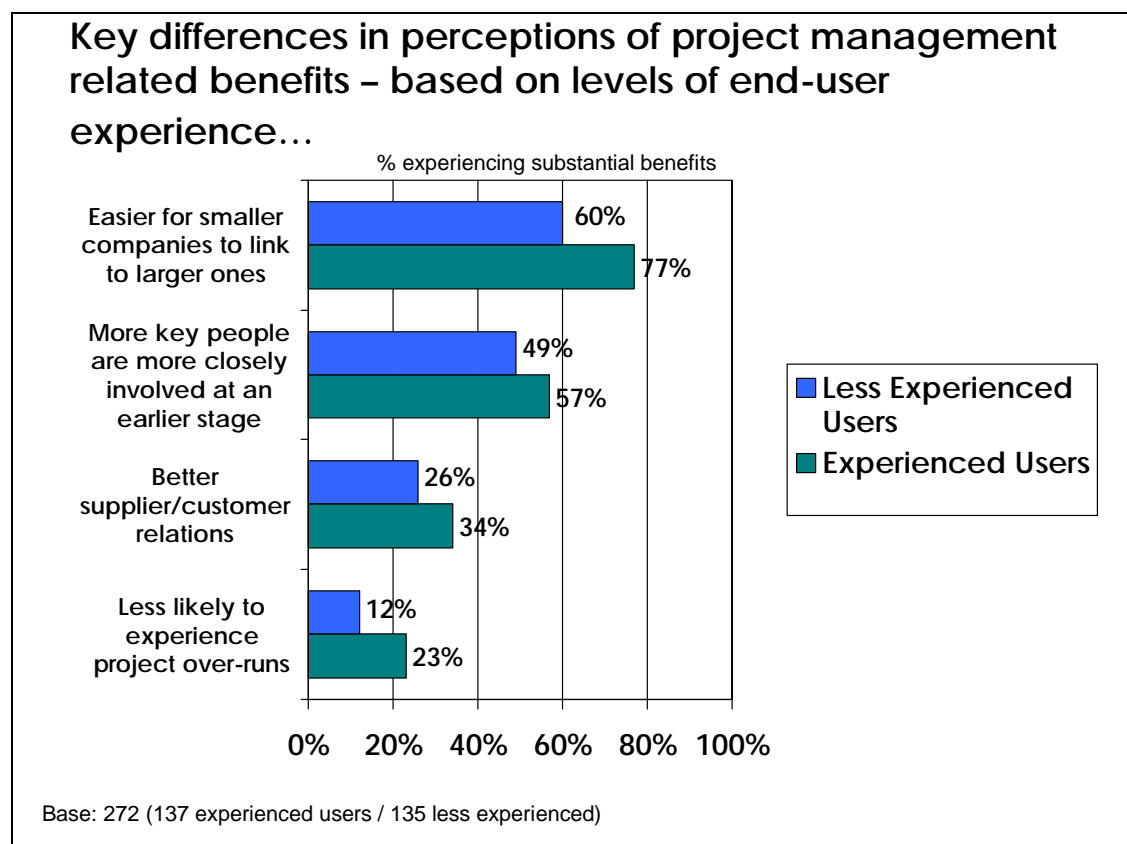
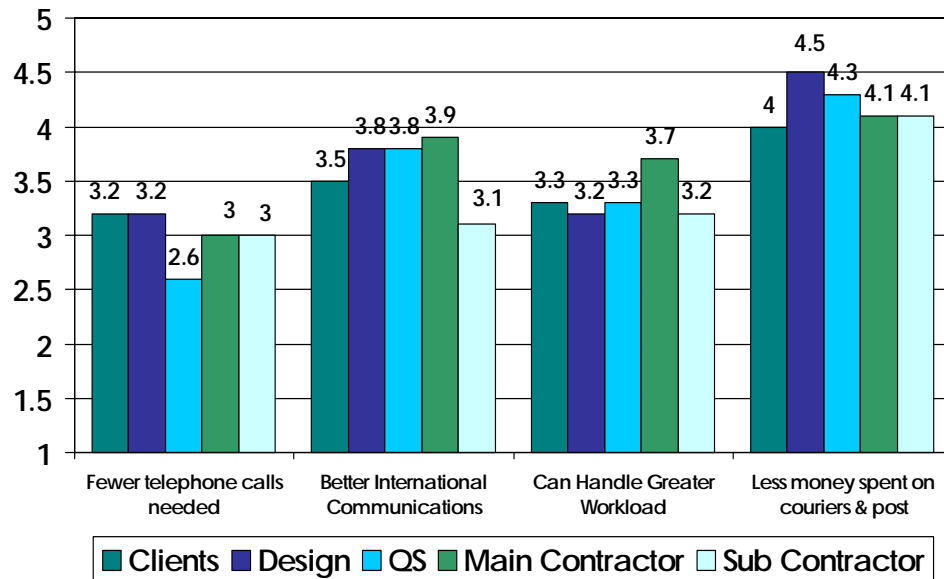


Figure 13

Therefore, in these four areas, benefits are likely to be less apparent after just one or two projects than they will become after several projects.

Generally speaking the views of different types of respondents were similar. However, figure 14 shows the areas where the most significant differences in average scores.

Q10 – Key Differences in Perceived Benefits by Sector (showing average scores out of 5)



Base: 272

Figure 14

Clients and Design companies appear most likely to feel they have experienced benefits in terms of reducing the need for telephone calls. Design companies were also most likely to feel that they'd experienced considerable benefits in terms of spending less on couriers and post.

Main contractors are more likely than average to see a benefit in terms of improved international communications and the ability to handle a large workload. Sub-contractors/suppliers, by contrast, are less concerned with international communications, probably because their focus is primarily within their local area/the UK only.

9. Benefits in terms of Document Management, Storage and Retrieval

The main benefit offered by the technology in terms of document management is that users believe there is significantly less chance of losing important documentation. They also highlight information security as a substantial benefit.

Table 3: Benefits Experienced in terms of Document Management, Storage and Retrieval
Base: 272

Factor	Substantial Benefit (4 or 5 out of 5)	Moderate Benefit (3 out of 5)
Less chance of losing important documents	82%	11%
Information is more secure	75%	18%
Distribution & production costs are less	74%	16%
Archived information can be found faster	72%	18%
Need less storage space for paper documents	70%	15%
Easier to find/retrieve the right document	66%	24%
Reduces the need for paper documents	58%	21%
Overall storage cost is less	58%	17%
Easier to refer back to past projects & learn from them	47%	21%

The perception of these benefits does not change significantly when comparing the most experienced users with the least experienced. The only difference we could find related to the belief that *"Information is more secure"* – here 81% of experienced users believe this benefit is substantial, compared with 69% of less experienced users. This would suggest that the extent to which this benefit is realised becomes more apparent with more frequent user experience.

In terms of sectoral differences it should be pointed out that here, again, many similarities exist between the different segments. Nevertheless, a few areas exist where significant differences can be measured. Clients and main contractors appear more likely to feel they have benefited in terms of reducing the requirements for storage space for documents and cutting their cost of storage.

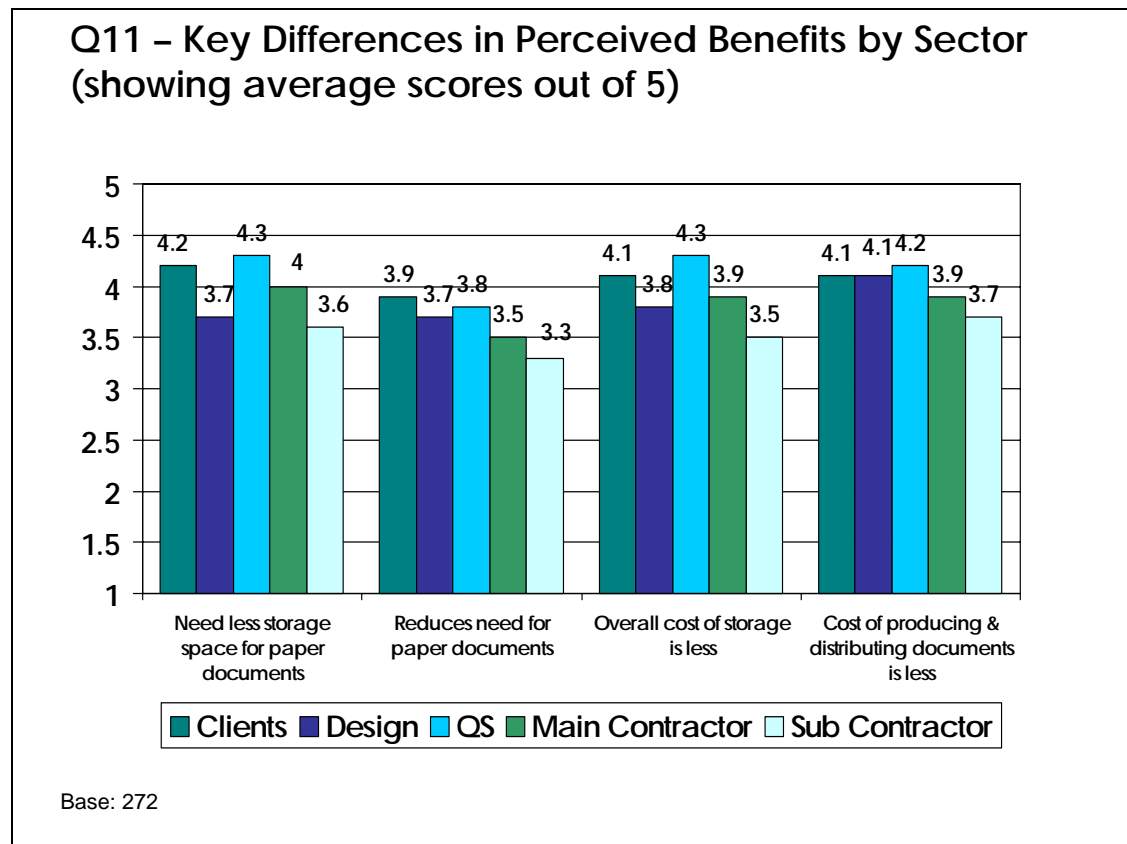


Figure 15

10. Benefits experienced in terms of the hand-over, commissioning, operations and maintenance

Not all respondents were involved with the hand-over phase of the project. Indeed, overall 105 out of the 272 respondents had a direct involvement in hand-over and were therefore able to answer questions about the role played by collaboration technology in the process. Their views of the key benefits experienced are shown in table 4.

Table 4: Benefits experienced in terms of the hand-over, commissioning, operations and maintenance
Base: 105 involved with the hand-over phase of projects

Factor	Substantial Benefit (4 or 5 out of 5)	Moderate Benefit (3 out of 5)
Documents can be accessed 24/7	86%	6%
Provides a more usable archive of health & safety information	66%	20%
Provides a more usable archive of facilities management information	64%	24%
Costs less to maintain documents	61%	17%
Amendments to documents can be made faster and more easily	60%	25%
Documents can be changed frequently, quickly and easily at little cost	59%	26%
Makes O&M manuals more accessible & usable	59%	25%
Documentation can be created faster & more easily	54%	30%
Documents are more complete at hand-over	48%	30%

As only 105 respondents were able to answer this section of the survey it was not possible to break this down further for any meaningful analysis at a sector level.

Some limited analysis in terms of user experience is possible. There were just 61 experienced users and 44 less experienced users answering these questions, hence, whilst analysis is possible we should exercise a greater degree of caution in interpreting differences between the two groups. Two differences are worth highlighting. Experienced users were more likely to feel that *"Documents are more complete at hand-over"* – 56% felt that they had seen substantial benefits here, compare to just 39% of less experienced users. Similarly, 64% of experienced users believe that they'd seen substantial benefits in so far as the technology *"Makes O&M manuals more accessible & usable"* – compared to 53% for less experienced users.

11. Opinions of Commissioning Clients Regarding Collaboration Technology

The 34 commissioning clients were specifically asked about their own attitudes to the technology as clients. The results are shown in figure 16.

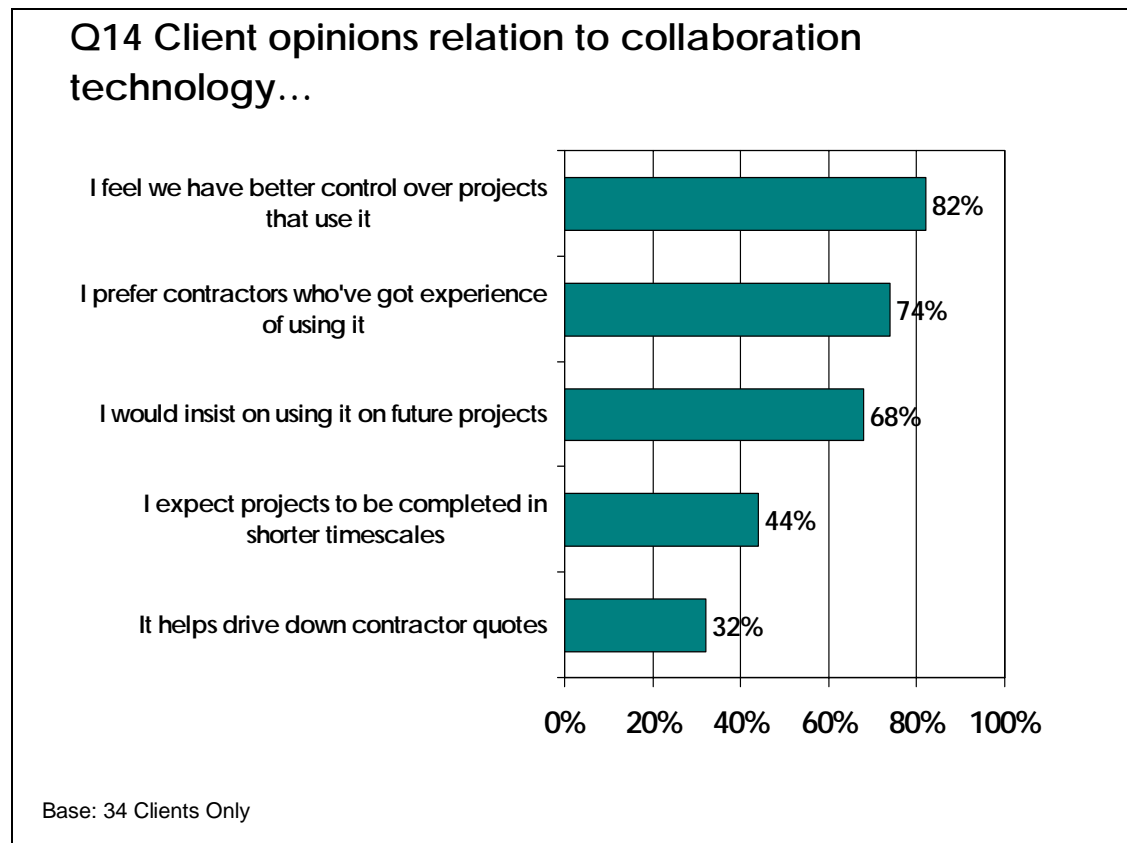


Figure 16

The vast majority of commissioning clients are strongly attracted to the level of control they feel it provides them – this is clearly identified by them as a key win. They are much less concerned about what the technology might offer them in terms of driving down the cost of the contract or reducing the overall timescales. The main attraction of the technology lies, much more, in its ability to make them feel as though they are fully in control and fully informed with regard to progress on the project.

There is strong evidence to show that a substantial proportion of commissioning clients see the ability of potential contractors to work with the technology as an important consideration in awarding contracts. Three quarters of them say they would actively favour suppliers who could demonstrate expertise in using collaboration technology and over two thirds openly admit that they would exclude contractors who were unwilling to use such technology from their shortlists.

It would seem, therefore, that winning large construction contracts in future will increasingly depend upon the ability of the contractor to demonstrate both a willingness and a positive track record of working with collaboration technology.

12. Opinions of Contractors and Suppliers Regarding the Technology

The contractors/suppliers appear to be very aware that many of their larger clients are increasingly looking to work with people using collaboration technology as figure 17 shows. Indeed, nearly 70% feel their track record of experience in using the technology gives them a real competitive edge when bidding with certain clients (something which the clients themselves openly state).

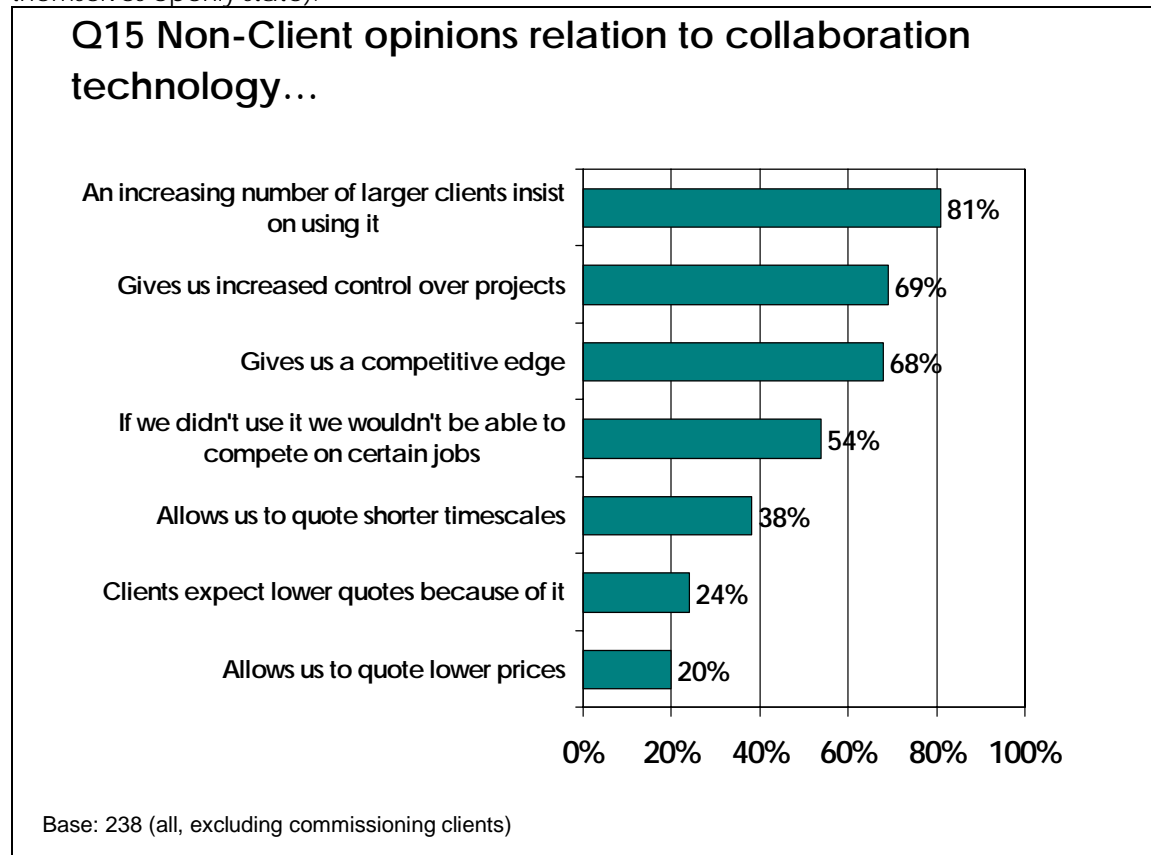


Figure 17

In addition to the pressure placed on people by the commissioning clients, many contractors and suppliers also feel that the technology offers them benefits in terms of a greater degree of control over the project in general. To a lesser degree, contractors and suppliers feel the technology enables them to submit lower quotes or complete work in shorter timescales but, as is the case with clients themselves, this view is only held by a minority.

13. Key Barriers to Growth in the Use of Collaboration Technology

Respondents were asked to identify the potential problem areas/barriers they had encountered which might hamper the adoption of the technology in future. The results from this question are shown in table 5.

Table 5: Disadvantages/Potential Barriers Identified
Base: 272

Nature of Barrier/Disadvantage	Proportion Identifying
Hard to get everyone to agree to make full use of the technology	73%
Some system processes can be very time consuming	73%
Takes a while to set up (agree protocols, train staff etc)	67%
Need training on different systems for different projects	67%
Easier communications encourage more changes/amendments	60%
Time saved on some processes is cancelled out by time added elsewhere	58%
Cost of initial IT investment is high	53%
IT literacy in the construction industry is poor	53%
Another source of information Email: Post: Fax: Now the Extranet	50%
More people getting involved - "too many cooks spoiling the broth"	45%
Not easy to "mark up"/add notations to electronic drawings	42%
Reduced personal contact makes working relationship harder	40%
Creates more work, having to do the same job twice	38%
Makes things too transparent/places you at a competitive disadvantage	14%

Those challenges identified by over 60% should be seen as the most pressing for suppliers to address in order to encourage wider use of the technology in the future. By contrast the concern over too much transparency would appear limited to a very small minority and need not represent a particular priority for suppliers to worry about.

It is interesting to note that a significant proportion believe that the easier communications brought by this technology results in a greater volume of changes and amendments. This, in itself, might well mean that actual cost and time savings made within the context of the overall project are less substantial than they might otherwise be. However, this is not necessarily just a negative, because it also appears to mean that both the commissioning client and the various contractors and suppliers feel that they have a higher degree of control over the project as a result.

From the perspective of the commissioning client this might well be a very important factor in their enthusiasm for the technology. Whilst it might mean that timescales and costs are not radically slashed the benefits gained in terms of peace of mind cannot be underestimated. No doubt clients' greatest fears relate to the possibility of dramatic overruns – either in terms of time, or cost, or both. Anything that can provide them with a higher degree of assurance that such problems won't emerge is likely to be highly attractive for them. This, then, is probably what clients find most attractive about the technology.

There were some different perceptions of the nature of these barriers/challenges held by different types of respondent. Design respondents (either architects or civil engineers) were most likely to identify a wider range of problems to a more significant degree. Commissioning clients and Quantity Surveyors were less likely to highlight problems. Table 6 shows the differences of opinion recorded between the different types of respondent.

Table 6: Disadvantages/Potential Barriers Identified – By Type of Respondent
Base: 272

Nature of Barrier/Disadvantage	Client	Design	QS	Main Con	Sub Con
Base (for each type of respondent):	34	73	32	69	64
Hard to get everyone to agree to make full use of the technology	62%	74%	56%	75%	56%
Some system processes can be very time consuming	62%	82%	59%	70%	80%
Takes a while to set up (agree protocols, train staff etc)	62%	74%	56%	86%	64%
Need training on different systems for different projects	68%	77%	59%	64%	61%
Easier communications encourage more changes/amendments	53%	64%	47%	58%	66%
Time saved on some processes is cancelled out by time added elsewhere	32%	66%	56%	54%	67%
Cost of initial IT investment in is high	50%	49%	66%	61%	42%
IT literacy in the construction industry is poor	47%	47%	38%	65%	64%
Another source of information Email: Post: Fax: Now the Extranet	38%	62%	50%	46%	48%
More people getting involved - "too many cooks spoiling the broth"	41%	48%	41%	48%	42%
Not easy to "mark up"/add notations to electronic drawings	41%	45%	41%	43%	39%
Reduced personal contact makes working relationship harder	35%	49%	25%	39%	42%
Creates more work, having to do the same job twice	35%	48%	31%	30%	41%
Makes things too transparent/places you at a competitive disadvantage	6%	18%	13%	9%	19%

In instances where a particular sector has identified a barrier/problem to a significantly higher degree than average this has been highlighted in bold.

There was little difference worth noting between the opinions of highly experienced users and those of less experienced ones with regard to these barriers/disadvantages. However, higher levels of user experience did result in a change of opinion in two areas. Less experienced users were more likely to feel that the *"Cost of initial IT investment is high"* – 59%, compared with 47% of more experienced users. More experienced users were also **more** likely to believe that a significant barrier relates to *"IT literacy in the construction industry is poor"* – 57% vs. 48% for the less experienced users.

14. Key Differences between Benefits Experienced by Loyal Users and those Experienced by others

It is no surprise to find that users of the technology who were the most highly committed to it (i.e. *"Loyal"* or *"Loyal Advocates"* as defined in section 5) were also much more likely to claim that they had experienced substantial benefits for a number of different factors.

Table 7 shows the key differences recorded between the experiences of loyal users as against those recorded by other users. Only those factors with the greatest differences are shown (and it should be noted that in some cases the level of difference between the two groups was minimal or even non-existent). In each case we have shown the proportion of people that claim that their business has experienced significant benefits in terms of the factor concerned (i.e. they provided a score of 4 or 5 out of 5 as an indication of the level of benefits experienced).

Table 7: Key Differences between Benefits Identified as Substantial by LOYAL users vs. the rest of the market
Base: 142 Loyal vs. 130 Rest

Factor	LOYAL	REST	Difference
Help with Quality Standards	70%	35%	35%
Overall time savings	69%	38%	31%
Easier to link small businesses to larger ones	77%	48%	29%
Better communications in the design phase	74%	46%	28%
Easier to find/retrieve the right documents	81%	51%	30%
Greater involvement of key people at an earlier stage	64%	40%	24%
Document creation is faster and easier	65%	42%	23%
O&M manuals are more complete at the handover phase	70%	46%	24%
Better archive of FM info at handover	75%	50%	25%
Faster review & sign-off of documents	59%	40%	19%
Better accountability for all parties	86%	59%	27%
Easier to find what you want quickly	68%	47%	21%
Less re-work due to out of date information	61%	43%	18%
Documents can be changed frequently, quickly and easily	68%	48%	20%
Less confusion over which version is the current one	80%	58%	22%

The obvious question to ask is *why is it that some people are clearly far more likely to say the benefits they have experienced are substantial than others?* There are a number of possible answers to this that are worth considering – indeed, in all likelihood the true answer in any one case might stem from a combination of factors:

- LOYAL users had bigger problems/challenges in the area(s) concerned in the first instance. Thus a loyal user might praise the benefits that collaboration technology has brought them in terms of faster/easier document creation simply because their business had particular problems with this aspect of construction projects prior to adopting the technology. The technology, then, served to impose a more structured way of working and a basic discipline that might have been entirely lacking before. Those people that had more rigorous processes in place already may therefore have noticed less of an improvement when they switched to using collaboration technology.
- Certain issues may have been more of a concern for LOYAL users in the first place – for example they may have a greater need to link small businesses to larger ones by virtue of the type of construction projects they typically get involved with. Because the technology is able to offer specific advantages to a business with such specific requirements they are therefore more likely to highlight this as a significant benefit.

- There may be differences in terms of the specific nature of the technology used. Thus some users may have experience of using a particular combination of technologies that are especially well suited to dealing with the kind of issues they face. Other users may not have found such a good match. This, in itself, may explain some differences of end-user experience.
- LOYAL users may be better at leveraging the technology to deliver the benefits they claim to have experienced – i.e. they are better and smarter than their competitors in terms of knowing how to get the maximum benefits from the technology. This might be because they were more focused in terms of setting themselves objectives or it might be that they invested more wisely in terms of the original set up and training etc. Thus, in short, the issue is not so much which particular technology supplier has been used but, rather, more a case of how the user themselves has chosen to make use of the technology.
- It might be that LOYAL users had a closer involvement/greater influence over the selection of the technology they have used. Thus they had a greater say in ensuring that the collaboration technology selected was well suited to their specific needs.

15. Comparisons with Other Research

At around much the same time as this study was being conducted, the Harvard Design School was undertaking its own study looking at similar issues. The approaches were different in so far as the Harvard study focused on a small number of case studies (9 in total), many of which were based outside the UK. For each case study the views of more than one individual were canvassed – usually between three and five key people. Overall the Harvard study collected the opinions of 38 individuals.

The Harvard study also used a 5-1 scale to measure respondent perceptions of benefits experienced: utilising the same convention for low/high scores. Such measures were obtained for a total of 27 factors. Of these the highest score generated for any factor was a mean rating of 4.4 out of 5 and the lowest was 2.38. The factors measured were similar to those used in this study but different terms/phraseology were often employed which makes a like for like comparison impossible. Having said this, there a total of eight factors measured on both surveys that were sufficiently similar to warrant a comparison - shown in table 8.

Table 8: Comparison of Perceived Benefits Experienced from Collaboration Technology – Benchmark vs. Harvard - mean Scores achieved (5-1, where 5 is High and 1 is Low)
Bases: Shown for each factor

Benchmark Survey			Harvard Survey		
Factor	Mean Score	Base	Factor	Mean Score	Base
Better Audit Trail	4.1	268	Enabled having complete audit trail	4.2	37
Archived information can be found faster	4.0	260	Improved data availability	4.4	37
Ensures everyone works from the same version	3.9	269	Improved information version control	3.9	29
Geographically dispersed teams work better together	3.9	264	Enhanced working with virtual teams	3.6	36
Better communications between those involved in design	3.7	194	Improved timely capture of design/construction decisions	3.6	36
Less re-work due to using out-of-date information	3.5	264	Reduced rework/data re-entry	3.2	30
Overall time savings	3.5	267	Reduced delivery leadtimes	2.9	23
Better supplier/customer relationships	3.1	252	Improved project relationships with strategic partners	3.3	35

Obviously the categories measured in the two surveys are not identical and therefore one must expect potential differences of response to be accounted for by this. In addition the Harvard sample size is small for a quantitative survey (designed, as it was, more for use as a series of in-depth case studies) therefore some, potentially significant, statistical variance in the Harvard results should be expected.

Having said this it is worth noting the similar rank order of the factors measured, in particular:

- Audit trail related benefits
- Ability to find/access data/information swiftly

These two kinds of benefits score extremely highly in both studies.

Elsewhere, slight differences in terminology may account for the difference in rating. Specifically...

- The benchmark survey category *"Archived information can be found faster"* scores less highly than the broader term *"improved data availability"* used in the Harvard study – although both score highly.
- The Harvard measure for *"enhanced working with virtual teams"* scores lower than *"geographically dispersed teams work better together"*. This suggests the specific mention of *"geographic dispersal"* makes a significant difference & maybe the phrase *"virtual teams"* comes across as a bit too *"IT-techy"* to be associated with a business benefit quite so strongly.
- The more general term used by Harvard *"Reduced rework/data re-entry"* scores slightly less than *"less re-work due to using out of date information"* – perhaps the latter term serves to jog people's memories as to what problems tended to lead to re-work becoming necessary in the past.
- *"Overall time savings"* scores higher (and significantly so) than *"Reduced delivery leadtimes"* which would imply that time savings are being made in areas that often have nothing to do with supplier deliveries.

However, despite differences, the mean scores recorded in the two surveys are often reasonably similar. In the case of these eight factors, where a difference could be measured, the scores awarded were typically within +/- 7% of each other.

Appendix – Questionnaire

Contact: Named Contact on List

Good morning/afternoon, my name is From Benchmark Research Ltd. We are currently conducting a market research project on behalf of the NCCTP. The objective of the project is to investigate the benefits experienced by organisations using collaboration technology/extranet based project management solutions in the construction industry.

Would you be willing to spare me about 10-15 minutes of your time to run through a questionnaire on this theme? I can assure you that this is a market research project and that all your answers will be treated in the strictest confidence. Those who participate will receive a free copy of the summary results and will be entered into a free prize draw for an I-pod Video.

(The NCCTP = Network for Construction Collaboration Technologies Providers. It's a network of suppliers that includes 4Projects, Aconex, Asite, BIW Technologies, BuildOnline, Business Collaborator, Cadweb, Causeway Technologies and Sarcophagus.)

Background/Filter Questions

QA Which of the following best describes your company's main business?

Read out, Single code

A commissioning client of construction projects
A design company (civil engineer or architect practice)
A Quantity Surveyor
Usually the main/lead contractor on major construction projects
Usually work as a sub-contractor on major construction projects

QB Have you, personally, had any experience of using collaboration/extranet technologies on any of the construction projects you've been involved with in the past? For example, extranet/collaboration technologies from companies like 4Projects, Aconex, Asite, Autodesk, BIW Technologies, BuildOnline, Business Collaborator, CadWeb, Causeway or Sarcophagus etc?

Yes
No

continue
see below

IF NO – ASK FOR DETAILS OF ANY COLLEAGUES THAT HAVE USED SUCH TECHNOLOGIES & RESTART, IF NO COLLEAGUES HAVE – THANK AND CLOSE

QC How frequently have you (personally) had cause to use such technology?
Read out, single code

- On numerous projects
- On several projects
- On a few projects
- On just one or two projects

General Experiences as a User

Q1 For each of the following, please can you provide an overall rating of how satisfied you are with the way the technology itself has worked? Please give a score out of 5, where 5 out of 5 is very satisfied and 1 out of 5 is very dissatisfied: **Read out,**

	5-1 Score	Don't Know
Learning how to use the technology	_____	
Functionality of the technology	_____	
Easy to use overall	_____	
Service & support/availability of help & advice	_____	
Speed of uploading/downloading files	_____	
Reliability/ Availability/ Uptime of the service	_____	

Q2 How likely would you be to recommend this technology to a colleague or peer?
Read out, single code

Definitely would	Extremely Likely	Quite Likely	Not very Likely	Not at all Likely
---------------------	---------------------	-----------------	--------------------	----------------------

Q3 How likely is it that you'd want to use this technology again on future projects? **Read out, single code**

Definitely would	Extremely Likely	Quite Likely	Not very Likely	Not at all Likely
---------------------	---------------------	-----------------	--------------------	----------------------

Q4 Thinking about the overall performance of this technology, how would you rate it?
Read out, single code

Excellent	Very Good	Good	Fair	Poor
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Q5 Which one of the following statements is closest to your view of this technology?

Read out, single code

It is an excellent tool and I would strongly
Prefer to use it on as many future projects as possible

It is a very useful tool and I'd want to use it
Again on most, but not necessarily all, future projects

It is a useful tool in the right circumstances
But I wouldn't necessarily want to use it on all future projects

It has its advantages but overall I'm not that bothered
about using it again in future

My experiences with this technology are poor
And I'd prefer not to use it in future

Benefits Experienced

Q6 Have you personal experience of using collaboration technology for managing designs, drawings & design revisions? Read out, single code

Yes	-	continue
No	-	skip to Q9

Q7 What benefits do you feel collaboration technology has delivered in terms of the design process? Please give a score out of 5, where 5 out of 5 indicates a very significant benefit and 1 out of 5 indicates no benefit at all...Read out,

	5-1 Score
Better communications between those involved in design	_____
Designs produced faster	_____
Designs revised & changes agreed faster	_____
Design costs reduced	_____
Fewer revisions needed	_____
Less "re-inventing the wheel"	_____

Q8a Approximately, what was the average drawing approval time you experienced on projects that DID NOT use collaboration/extranet technology?

Prompt if necessary, single code

Q8b Approximately, what would your average drawing approval time be on projects that DO use collaboration/extranet technology? **Prompt if necessary, single code**

a) b)

- 1-2 days
- 3-5 days
- 6-9 days
- 10-14 days
- 15-19 days
- 20-24 days
- 25-29 days
- 30 days+
- Don't Know

Q9 What benefits do you think collaboration technology has delivered in terms of accountability & traceability? Please give a score out of 5, where 5 out of 5 indicates a very significant benefit and 1 out of 5 indicates no benefit at all...Read out,

5-1 Score

- | | |
|---|-------|
| Better traceability/visibility of documents | _____ |
| Faster review/sign-off of documents | _____ |
| Better audit trail | _____ |
| Better accountability for all parties | _____ |
| Ensures everyone works from same version | _____ |
| Less confusion over which version of is the current one | _____ |
| Helps with quality standard compliance | _____ |
| It's clearer who needs to do what and when | _____ |
| Less re-work due to using out-of-date information | _____ |
| Easier to find what you're looking for quickly | _____ |
| Less risk of litigation/disputes | _____ |

Q10 What benefits do you think collaboration technology has delivered in terms of project management, communications & team working? Please give a score out of 5, where 5 out of 5 indicates a very significant benefit and 1 out of 5 indicates no benefit at all ... Read out,

5-1 Score

Overall Time savings	_____
Overall Cost savings	_____
Can hit tighter schedules	_____
Identify problems earlier	_____
Resolve problems faster	_____
Better communications	_____
Better supplier/customer relationships	_____
Fewer meetings needed	_____
Fewer telephone calls needed	_____
More key people are closely involved at an earlier stage	_____
Better International Communications	_____
Project information available in central location	_____
Less likely to experience project over-run	_____
Easier to set, monitor and hit Key Performance Indicators	_____
Easier for smaller companies to link with large ones	_____
Can handle greater workload	_____
Geographically dispersed teams work better together	_____
Less money spent on couriers and postage	_____

Q11 What benefits do you feel collaboration technology has delivered in terms of document management, storage and retrieval? Please give a score out of 5, where 5 out of 5 indicates a very significant benefit and 1 out of 5 indicates no benefit at all ... Read out,

5-1 Score

Information is more secure	_____
Need less storage space for paper documents	_____
Reduces need for paper documents	_____
Easier to find/retrieve the right document	_____
Archived information can be found faster	_____
Easier to refer back to past projects & learn from them	_____
Overall cost of storage is less	_____
Cost of producing & distributing documents is less	_____
Less chance of losing important documents/records	_____

Q12 Would you personally get involved with the handover phase at the end of a construction project?

Yes
No

continue
skip to Q14 IF respondent is a "CLIENT" (as identified at QA). All non-clients go to Q15

Q13 What benefits do you feel collaboration technology has delivered in terms of hand-over & commissioning and operation & maintenance? Please give a score out of 5, where 5 out of 5 indicates a very significant benefit and 1 out of 5 indicates no benefit at all ... Read out,

5-1 Score

Provides a more usable archive of health & safety information	_____
Makes O&M manuals more accessible & usable	_____
Provides a more usable archive of facilities management information	_____
Documentation can be created faster & more easily	_____
Amendments to documents can be made faster and more easily	_____
Documents are more complete at hand-over	_____
Documents can be accessed 24/7	_____
It costs less to maintain documents	_____
Documents can be changed frequently, quickly and easily at little cost	_____

IF "CLIENT" [IDENTIFIED IN QA] CONTINUE, OTHERWISE GO TO Q15

Q14 Can you please say which of the following statements about collaboration technology/extranets you'd agree with? Read out, multicode

I would insist on using collaboration technology on future projects
I prefer contractors who've got experience of using collaboration technology
Collaboration technology helps drive down contractor quotes
I expect projects to be completed in shorter timescales when using collaboration
I feel we have much better control over projects that use collaboration
None of these

ALL CLIENTS NOW GO TO Q16, ALL NON-CLIENTS CONTINUE

Q15 Can you please say which of the following statements about collaboration technology/extranets you'd agree with? Read out, multicode

Our experience with collaboration technology gives us a competitive edge
An increasing number of larger clients insist on using collaboration technology
We can quote lower prices as a result of using collaboration technology
We can quote shorter timescales as a result of using collaboration technology
If we didn't use this technology we wouldn't be able to compete on certain jobs
We have better control over projects that use collaboration technology
Clients expect lower quotes where this technology is being used
None of these

Q16 What disadvantages/barriers have you encountered in using this technology?
Read out, multicode

IT literacy in the construction industry is poor
Cost of initial IT investment in is high
Not easy to "mark up"/add notations to electronic drawings
Easier communications encourage more changes/amendments
More people getting involved - "too many cooks spoiling the broth"
Takes a while to set up (agree protocols, train staff etc)
Need training on different systems for different projects
Some system processes can be very time consuming
Makes things too transparent/places you at a competitive disadvantage
Time saved on some processes is cancelled out by time added elsewhere
Reduced personal contact makes working relationship harder
Hard to get everyone to agree to make full use of the technology
Creates more work, having to do the same job twice
Another source of information Email: Post: Fax: Now the Extranet
Other (please state) ...
None of these

Classification

Name: _____
Job Title: _____
Company: _____
Address: _____

Telephone: _____

Thank you for your time. Benchmark Research operates under the Market Research Society's code of conduct, so all of your responses are strictly confidential and will be reported in a non-attributable manner. If you wish to verify that Benchmark Research is a bona fide research agency you can contact the MRS by dialling the operator (100) and asking for "Freephone MRS".

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THANK & CLOSE