Increasing the uptake of Inclusive Design in industry

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J. Goodman, H. Dong, P. Langdon, P.J. Clarkson, Increasing the uptake of Inclusive Design in industry. Gerontechnology 2006; 5(3):140-149. There is an increasing awareness of the need to design for a wide range of potential users, as reflected by approaches such as Inclusive Design. It has been shown that increasing usability and accessibility for older and disabled people benefits users in general because, where some are excluded from using a product or service, many more are likely to find it difficult or frustrating to use. However, while many companies agree with the principles of designing inclusively, many products are still difficult to use. This paper examines why this is so, presenting results from a survey of 101 UK companies. We discuss the nature of the main barriers and drivers for inclusive design and how these vary across companies. We consider how the barriers can be overcome and the drivers encouraged, in order to increase the uptake of Inclusive Design in the commercial world. Two case studies are presented, showing how Inclusive Design has been implemented effectively in industry.

Keywords: Inclusive Design, barriers in industry, drivers in industry

The population of the developed world is ageing[1], prompting the introduction of legislation requiring companies to consider older and disabled people in the design and provision of services. For example, the Disability Discrimination Act[2] in the UK and the Americans with Disabilities Act[3] in the USA have been successful in raising the levels of awareness and consideration of such people's needs. Changing demographics also mean that older and disabled people form a large and increasing group with considerable spending power[4]. There are both financial and legislative incentives for including these groups in design.

Approaches to help designers to do so have been developed, such as Universal Design[5], Inclusive Design[4,6] and Design for All[7]. These approaches have slightly different foci but they all encourage consideration of the needs of older and disabled people and seek to increase the range of those that can use the resultant product, environment or service.

However, despite the existence of such motivating factors and appropriate design approaches, many products still cannot be used easily by many older or disabled people[6,8]. Many companies are still not adopting Inclusive Design and similar approaches. This paper examines why this is the case, how companies can be encouraged to adopt Inclusive Design and how it can be put into practice effectively in a commercial setting. The paper presents the results of a survey of 101 UK companies and organisations, examining their awareness of Inclusive Design and asking them to identify barriers and drivers for it. This is backed up with individual case studies of Inclusive Design practice.

Related work

Previous studies identified some of the barriers and drivers for Inclusive Design. In the US, telephone interviews were conducted with 26 consumer product manufacturers[9] and a similar survey was carried out with 307 Japanese companies in five different industry categories[10]. Both studies identified a range of barriers and motivators for Universal Design, covering areas such as government regulation, training, market data, consumer demand, technical complexity and (the lack of) interest, knowledge and techniques.

These studies were based in the US and Japan, so caution needs to be taken over their application to other countries, such as the UK. Factors like regulations and education vary between countries, while other aspects, such as changing demographics and subsequent societal demand, are more ubiquitous across the developed world. For example, government regulation was considered more effective in the US and Japan than in the UK[11]. Nevertheless, these surveys provide pointers towards likely barriers and drivers and they informed our questionnaire design.

In the UK, a workshop found that only about a third of participant London FTSE100 companies were aware of Universal Design. There was also a misconception that designing for universal accessibility meant designing for the elderly and disabled only[12]. Also in the UK, a survey of 29 design professionals suggested that Design for All was widely known and understood but not widely practised within the design community[13]. Reasons given included lack of time, client backing, money and awareness of the possible market. Although these studies reveal some barriers, they are limited in that detailed barriers were not identified, and no comparison was made between industry sectors.

Bellerby and Davis[14] talked to half a dozen product developers and market-

ing specialists. They suggested that standards and guidelines could be important drivers but were mostly not presented in an appropriate format. Underwood and Metz[15] also discussed how the arguments for Inclusive Design could address generic business drivers ranging from legislation to brand image. These studies provide insight, but were based on the viewpoints of very limited numbers of consultancies.

Dong et al.[11,16] conducted a fuller study of barriers and drivers in the UK through mail surveys of 38 manufacturers and retailers and 35 design consultancies. They found that these groups perceived major barriers differently, each tending to consider that they came from the other parties. In contrast, major drivers were similar between groups. Amongst manufacturers and retailers, key barriers were due to assumptions (for instance that Inclusive Design is more expensive), followed by practical and implementation difficulties (for instance, lack of time to learn).

The survey described in this paper builds on this previous study. Dong's study targeted small and medium enterprises (SMEs) and used different questionnaires for different respondent groups. In contrast, the current survey targeted large organisations as well as SMEs and used a single questionnaire to facilitate comparison across companies. We also expanded the sample size, allowing more reliable analysis, particularly of factors involved in companies' responses, and investigated companies' demographics, current position and business drivers in more detail.

Context

The survey was based on a smaller survey carried out to inform the development of Inclusive Design training materials by examining what companies really needed[17]. It used the same question-

naire as the smaller survey and included its results, but expanded the sample considerably. The work was also part of the i~design project, which seeks to develop approaches and data to equip industry for Inclusive Design. The survey assists this by providing the increased understanding of the commercial setting needed to develop tools that are really useful.

A preliminary examination of some of the results was carried out on a subset of companies and questions[18-19]. However, the full sample yielded a different factor breakdown with greater statistical reliability and allowed fuller analysis, more detailed discussion and resulting suggestions for overcoming the barriers and encouraging the drivers.

SURVEY METHOD
Questionnaire design
The questionnaire was divided into six main parts: company profile; understanding of Inclusive Design (and related concepts); company position on Inclusive Design; drivers for it; barriers to it; and approaches to increase its use. This structure enabled us to understand the responses' context before examining motivations and barriers in detail.

The first three parts addressed the respondent's context, allowing us to investigate how aspects such as company size and awareness of Inclusive Design affect response to it. Part 1 provided a company profile and Part 2 examined awareness and understanding of Inclusive Design and related terms. Part 3 started with the following definition of Inclusive Design to ensure that subsequent responses were given with a common understanding: "a process whereby designers, manufacturers and service providers ensure that their products and services address the needs of the widest possible audience, irrespective of age or ability" (derived from a Foresight report[20]). This section then examined awareness of In-

clusive Design, inclusivity of products or services, effort and interest in Inclusive Design and awareness of legislation and codes of practice. This provided a more in-depth understanding of company position.

Parts 4 and 5 listed possible drivers and barriers to Inclusive Design, derived from those identified by Dong et al.[11]. Given the importance in general of commercial imperatives, such as profit, drivers relevant to the business case were broken down into more detailed drivers, with the help of a consultancy with expertise in this area. In Part 4 (Drivers), responses were elicited on a scale of 1 to 4, allowing investigation of their relevant importance. In Part 5 (Barriers), respondents identified barriers in their organisation, and then identified and ranked the three most and three least important ones. Comment boxes allowed other drivers and barriers to be added.

Finally, Part 6 elicited responses to possible approaches for encouraging Inclusive Design. The options were specifically related to the project and the interests of the research teams, although space was provided for other suggestions.

At several points, respondents indicated their level of agreement on a four-point scale. It should be noted that such scales are biased, with respondents tending away from disagreement, particularly strong disagreement. Nevertheless, they can indicate the relative strength of different aspects of company position, for instance, of the response to different drivers.

Questionnaire distribution
Complete responses were obtained from 101 UK companies and organisations, mostly from the design, manufacturing and retail sectors. Many of the responses were obtained through industry contacts, while others were recruited by phoning organisations identi-

fied through a web search. Targeted sectors included telecommunications and IT, consumer electronics, household durables, energy, medical/pharmaceuticals, transport and fast moving consumer goods.

An initial sampling analysis suggests that the sample is predominantly from the Midlands, South East and London areas, indicating that it may be generalisable to this geographic and economic group. Some self-selection is likely, as organisations with prior awareness of and interest in Inclusive Design are more likely to want to participate. The sample may, therefore, display a higher awareness of Inclusive Design than UK industry as a whole. We took this into account by examining companies' awareness levels and including this in the factor analysis.

SURVEY RESULTS
Awareness and understanding
Survey respondents were asked if they had heard of the terms Inclusive Design, Universal Design and Design for All. A majority (76%) had heard of Inclusive Design, with fewer having heard of the other terms (37% and 54% respectively). While 33% of companies had heard of all three, 16% had heard of none of them.

Respondents then described what they thought these terms meant. Their definitions indicated that the majority had a reasonably good understanding of Inclusive Design, which was widely regarded as design for as many people as possible. In addition, 41 respondents specifically mentioned ability or disability, 13

ageing or older people, and 15 usability or accessibility. Moreover, a number pointed out that disability was not only physical, but also concerned with cognitive and emotional abilities and social issues. Definitions covered product, service, interface, communication and packaging; and related to the design process, outcome and methodology.

Company position on Inclusive Design
About half the respondents rated their companies as low or very low (on a four-point scale) on current inclusivity (48%) and effort invested in ensuring inclusivity (49%). There were higher levels of awareness and interest in Inclusive Design, but, even so, large proportions of respondents (39% and 23% respectively) indicated low or very low awareness and interest. Given the self-selection in the survey, the real levels of awareness, inclusivity, effort and interest are likely to be lower than these.

Drivers for Inclusive Design
Respondents were then asked to indicate their level of agreement (on a four-point scale) with five drivers for Inclusive Design and to say how effective they

Table 1. Agreement with drivers for inclusive design, as percentages of responses. Percentages may not total 100 as some respondents indicated that they did not know

Possible drivers	%	
	Total disagree	Total agree
Drivers for inclusive design		
Legislation	43	47
British Standard BS7000-6	29	24
Social responsibility	28	67
Demographic/consumer trends	25	69
Brand enhancement	27	66
Effectiveness in achieving commercial benefits		
Entrance to a new market	38	62
Increase potential market	39	61
Increase current market share	44	56
Increase customer loyalty	38	62
Increase usage	52	48
Increase customer satisfaction	21	79
Innovation and differentiation	29	71
Enhance brand	37	63

thought Inclusive Design could be in helping to achieve eight commercial benefits (*Table 1*). Examining the proportions who agreed or strongly agreed, we see that key drivers are demographic and consumer trends, social responsibility and brand enhancement. Key commercial benefits are increasing customer satisfaction and producing innovation and differentiation. The potential to increase customer satisfaction also scores highest when examining only those who strongly agreed, indicating the importance of this driver.

Barriers to Inclusive Design

Respondents then identified barriers to Inclusive Design in their organisation from a list of ten possibilities (*Figure 1*). Barriers most frequently identified were a lack of time and budget for supporting Inclusive Design (E), a lack of knowledge and tools for practising it (C), and that Inclusive Design was not a perceived need of the end users (H). Twenty of the 101 companies stated that none of the listed options was a barrier and did not describe any further significant barriers.
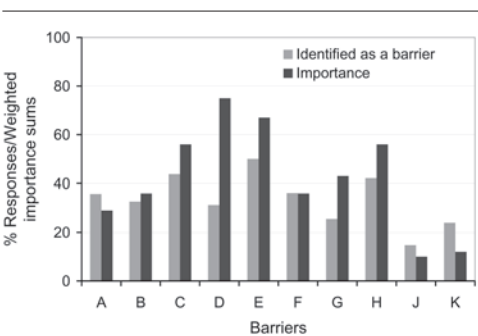

Figure 1. Identification (% of responses) and perceived importance (weighted importance sums) of companies' barriers to inclusive design; A = Lack of internal support; B = Requires cultural change; C = Lack of knowledge / tools; D = Lack of business case; E = Lack of time/budget; F = Too difficult; G = Compromises aesthetics; H = Not perceived end user need; J = Stigma; K = Unachievable

Respondents then identified and ranked the three most important barriers. Weighted sums of their responses were calculated by assigning them weights of one, two and three in order of increasing importance (*Figure 1*). As expected, the barriers identified most frequently were also considered to be important. However, surprisingly, the barrier identified as the most important (D: the perception that there is no justifiable business case for Inclusive Design) was not one of the most common. Fewer respondents identified it as a barrier, but those who did considered it extremely important.

FACTORS AFFECTING RESPONSES

A factor analysis was carried out to determine the main factors affecting companies' responses to Inclusive Design. It was conducted in SPSS v12 using Principal Component Analysis without normalised rotation of components. There were 101 cases (companies) and a reduced set of 26 questions was chosen to represent the main questionnaire sections while ensuring statistical validity by minimising sampling error. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was good (0.710), indicating useful sampled underlying relationships between the variables, while Bartlett's test of sphericity indicated highly significant relationships between the variables (χ^2=812.28, df=300, p<0.0001).

Initially, the factor distribution was expected to follow the questionnaire's sections. The analysis was interpreted with reference to the questions grouped by factors and their relationship with the original questionnaire. The number of factors used was decided by reference to a scree plot and the interpretability of the factor solutions from 1 to 5 factor solutions. Four factors account for 49.6% of the cumulative variance (*Table 2*). The remainder of the variance was distributed approximately evenly among factors 5 to 23 and their factor

Table 2. Key factors and factor loadings in companies' responses; respondents indic-ated levels of agreement with the statements; ID = Inclusive Design; DDA = Disability Discrimination Act; ADA = Americans with Disabilities Act

Question		Factor			
#	Content (abbreviated)	1	2	3	4
	Factor 1				
3.1	Level of awareness of ID	.771			
3.2	Perceived inclusivity of products/services	.710	-.364		
5.1a	There is little or no internal support for ID	-.683			
5.1d	There is no justifiable business case to support ID	-.657			
5.1e	There is a lack of time and budget to support ID	-.597		.316	
5.1c	We lack the knowledge and tools to practise ID	-.592	.412	.317	
4.2a	ID would help us to achieve entrance to a new market	.586	.378		
3.5a	Awareness of the DDA or ADA	.540	-.370		.378
4.3	ID could be effective in enhancing our brand	.514	.474		
5.1b	Implementing ID would require significant cultural change	-.507	.352		.410
3.5b	Awareness of British Standard BS7000-6 (Managing ID)	.493			
	Factor 2				
6.1a	A convincing business case for top level management is important for encouraging ID		.655		
4.2g	ID is a source of innovation and differentiation	.426	.599		
4.2c	ID helps to achieve a larger share of the current market	.560	.573		
6.1d	Effective tools to market ID are important for encouraging ID	.362	.509		-.406
4.1c	Social responsibility motivates us to consider ID		-.485	.336	
6.1c	Skills/tools to assist with ID are important for encouraging ID		.467	.350	-.358
	Factor 3				
5.1g	ID compromises the aesthetics of the design			.628	
5.1i	There is a stigma associated with ID			.624	
4.1e	Brand enhancement is a key driver for ID			.536	
4.1a	Legislation is a major driver for ID			.484	
4.1d	Demographic and consumer trends are key drivers for ID			.452	.352
	Factor 4				
1.1	Number of employees	-.303			.625
4.1b	British Standard BS7000-6 will help us to practise and manage ID				-.570
1.5	Existence of a post for corporate social responsibility				-.386

loadings did not afford a systematic or reliable interpretation. A rotated solu-tion was not used as this failed to sub-stantially change the distribution of vari-ance accounted for by the primary factors. The four key factors are de-scribed below.

Factor 1: Awareness of Inclusive Design and lack of corporate barriers
The main component in this factor was the level of awareness of Inclusive Design, followed by the current inclusiv-ity of products and services. Companies responding positively to these also ten-ded to respond negatively to barriers stemming from corporate or organisa-tional factors, such as the lack of intern-al support, time, budget, knowledge and tools for Inclusive Design and the need for significant cultural change. We may surmise that awareness of Inclusive Design goes together with a lack of cor-porate barriers to it. Other, lesser com-ponents in this factor included some of the more commercial drivers and aware-ness of legislation and standards.

Factor 2: Arguments for commercial (rather than social) value of Inclusive Design
A set of commercial drivers grouped to-gether: a convincing business case, ef-fective marketing tools, and Inclusive Design as a source of innovation and dif-ferentiation and as a means of obtain-

ing more of the current market. Positive responses to these also clustered with a negative response to social responsibility as a driver, suggesting that social and commercial arguments may not reach the same companies. Lesser components, including some variables contributing primarily to factor 1, indicate that skills, knowledge and tools to assist with Inclusive Design could be particularly helpful for such companies.

Factor 3: Concern about effects of Inclusive Design on brand positioning

When asked about barriers, some companies said that Inclusive Design compromises aesthetics and has a stigma associated with it. This was associated with a concern for brand, although this was expressed more positively, with Inclusive Design's potential for brand enhancement being seen as a driver for it. These companies were also driven to consider Inclusive Design by legislation and demographic and consumer trends.

Factor 4: Effect of size (or type) of company on attitude to Inclusive Design

This factor had significant contributions from some other factors' questions, particularly 5.1b and 6.1d. The main component was company size, with larger companies clustering with Inclusive Design needing significant cultural change and with negative responses to British Standard BS7000-6, tools for marketing Inclusive Design and the existence of a corporate social responsibility (CSR) post.

Care was taken in interpreting this factor as responses to BS7000-6 are skewed by low levels of awareness of it. Also, the factor loading on the existence of a CSR post is fairly low and many of the larger organisations do actually have one. Further analysis also indicates a correlation between the size and type of companies, with small organisations (under 250 employees) being mainly con-

sultancies and manufacturers of specific types of product (for instance, wheelchairs). It may be the company type rather than size that is the main influence here.

DISCUSSION

The majority of respondents had heard of Inclusive Design and defined it broadly correctly. This represents an increase in awareness in recent years; in an earlier survey[16], half the respondents were not familiar with it. However, there was still a significant proportion (39%) with low levels of awareness. In addition, about half the respondents rated their companies as low on current inclusivity and effort invested in Inclusive Design. It appears that awareness and understanding are not enough – it is important to convince companies to do something about it.

Such work can build on existing drivers for Inclusive Design, such as its potential to increase customer satisfaction and produce innovation and differentiation, as well as demographic and consumer trends, social responsibility and brand enhancement. These drivers are similar to those found by Dong et al.[11], except for social responsibility and being a source of innovation and differentiation, which were not investigated in that study.

These drivers are key components to include in awareness-raising and training material. It is important to convince companies that Inclusive Design can actually help to achieve the identified commercial advantages. Better worked-out arguments are needed, as are concrete examples, such as OXO Good Grips' range of kitchen tools[21], demonstrating perceptible advantages in these areas.

If significant progress is to be made, it is also necessary to address the barriers to Inclusive Design, particularly those of

lack of a justifiable business case, time, budget, knowledge and tools, and the concern that Inclusive Design is not a perceived end user need. These barriers are similar to those found by Dong et al.[11], although that study did not investigate whether Inclusive Design was a perceived end user need.

It is, therefore, important to build a more compelling business case, identifying what companies themselves find compelling. The drivers and commercial benefits highlighted in this survey can provide pointers for this, identifying aspects that could usefully be tied into the business case. In addition, it is important to respond to the perception that Inclusive Design is not an end user need. Awareness-raising material needs to demonstrate how Inclusive Design is relevant to different groups of end users and product types.

The lack of knowledge and tools also indicates a need for better and more widely available training and better tools, both methodological and technical, for putting Inclusive Design into practice. These need to take into account the lack of time and budget and provide ways of achieving additional inclusivity efficiently and cheaply. In some cases, more work is needed to determine how this can be done, tackling fundamental questions (for instance, about the technical feasibility of some inclusive solutions).

It is also important to address the variation across organisations, developing different approaches for different types of companies. In particular, Section 4 identified key factors in companies' responses, which may correspond to distinct company types:

Companies with a high level of awareness and low corporate barriers
It is important to keep supporting and encouraging these companies, but efforts at raising awareness and overcoming barriers may be more profitably spent on other companies. This factor also indicates the importance in general of raising awareness and of addressing corporate issues, as well as helping individual designers.

Companies influenced by commercial, rather than social, concerns
These companies need a clear business case and emphasis on commercial drivers. Social arguments may have a negative effect. Although many companies fall into this category, many charitable and specialist organisations are heavily influenced by social factors and others have over-riding concerns, as in the following category.

Companies concerned with brand
For them, it is important to show how Inclusive Design need not be stigmatising nor compromise aesthetics but rather enhance brand. These companies are also often motivated by legislation and consumer trends so it is useful to include these in the approach.

CASE STUDIES
We back up these results with two case studies in the adoption of Inclusive Design. Both company A, which produces packaging, and company B, a mobile telecommunications company, had their initial involvement triggered through the personal interest of team members and a recognition of Inclusive Design's relevance to their particular businesses. Company A was motivated by the importance of brand loyalty in packaging and the need to maintain this as customers age, while company B was keen to move beyond the young adult market by producing a new simple handset.

This initial interest was encouraged and developed through the efforts of internal Inclusive Design 'champions' and

close collaborations with experts from our centre and our research partners. We worked with them in training workshops and by auditing existing products, estimating levels of user exclusion, providing expert opinion and identifying 'pinch points' (features that exclude). We helped them to identify scope for improvement and develop improved concepts.

This work is ongoing. The research team is currently working with company A to design a new, more inclusive product prototype. This company plans to launch its first product designed specifically to be more inclusive in 2007. Company B launched its new simple handset in early 2005, with sales exceeding all expectations, and has recently asked one of our research partners to provide a working prototype of a next generation inclusive handset.

During this process, for company A, working with disabled users and seeing examples of inclusive work encouraged emotional buy-in. The business case was not explicitly discussed but retaining brand loyalty, a business case concern, was a key driver. With Company B, the business case was explicitly discussed throughout and is a key driver for the further provision of inclusive products.

The case studies demonstrate the importance of tailoring material to particular companies, putting the right people together, engaging key people in companies and utilising appropriate training and examination of existing products. They also show the importance of considering business factors, whether or not through the presentation of an explicit business case.

CONCLUSIONS

This paper has presented results from a survey of attitudes to Inclusive Design in industry, finding reasonably high levels of awareness of Inclusive Design, but also the need for continuing work on convincing companies to do something about it.

Such work can build on the main drivers and barriers found, key drivers being demographic and consumer trends, social responsibility, brand enhancement and Inclusive Design's potential to increase customer satisfaction and produce innovation and differentiation. These can be profitably included in awareness-raising and training material, and can inform the presentation of a more compelling business case. The main barriers were a lack of time, budget, knowledge, tools and a justifiable business case, as well as the perception that Inclusive Design is not an end user need. To overcome these, better, efficient and more widely available training and tools are needed. We also need to demonstrate how Inclusive Design is relevant to different groups of end users and product types.

Barriers and drivers vary between organisations, suggesting a need for tailored approaches. The survey suggests three distinct company types that can be addressed in different ways: those with a high level of awareness and low corporate barriers, those influenced primarily by commercial concerns, and those strongly concerned with brand. We are continuing to develop methods to address these barriers and drivers, in particular through a three-day workshop, equipping designers to put Inclusive Design into practice. Continuing research investigates designers' work practices, enabling the provision of tools that better meet their needs.

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References

1. US Census Bureau. International Data Base (IDB); www.census.gov/ftp/pub/ipc/www/idbnew.html; accessed June 2, 2006, data updated April 26, 2005

2. Disability Discrimination Act 1995. London: The Stationary Office. Available from the Disability Rights Commission, www.drc-gb.org/thelaw/thedda.asp; accessed June 2, 2006

3. Americans with Disability Act 1990. U.S. Department of Justice: www.usdoj.gov/crt/ada/pubs/ada.txt; accessed June 2, 2006

4. Coleman R. Designing for our future selves. In: Preiser WFE, Ostroff E, editors, Universal Design Handbook. New York: McGraw-Hill; 2001; pp 4.1-4.25

5. Preiser WFE, Ostroff E. Universal Design Handbook. New York: McGraw-Hill; 2001

6. Keates S, Clarkson PJ. Countering design exclusion: An introduction to Inclusive Design. London: Springer; 2003

7. European Institute for Design and Disability. EIDD Website: www.design-for-all.org; accessed June 2, 2006

8. Vanderheiden GC. Thirty-something million: should they be exceptions? Human Factors 1990;32(4):383-396

9. Vanderheiden G, Tobias J. Universal design of consumer products: current industry practice and perceptions; 2000: http://trace.wisc.edu/docs/ud_consumer_products_hfes2000/index.htm; accessed June 2, 2006

10. Unpublished report. Kyoyo-hin (Universal Design) in Japan. Available from the i~design collection, Helen Hamlyn Research Centre, Royal College of Art, UK; 2000

11. Dong H, Keates S, Clarkson PJ. Inclusive design in industry: barriers, drivers and the business case. Proceedings of 8th ERCIM Workshop 'User Interface for All', Vienna, Austria; 2004

12. Keates S, Lebbon C, Clarkson PJ. Investigating industry attitudes to universal design. Proceedings of Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) 2000, Orlando, USA; 2000; pp 276-278

13. Sims RE. 'Design for All': Methods and Data to Support Designers. Ph.D. thesis, Loughborough University, Loughborough, UK; 2003

14. Bellerby F, Davis G. Defining the limits of Inclusive Design. Proceedings of Include 2003. London: Royal College of Art; 2003; pp 1:00-1:17

15. Underwood MJ, Metz D. Seven business drivers of Inclusive Design. Proceedings of Include 2003. London: Royal College of Art; 2003; pp 1:39-1:44

16. Dong H, Clarkson PJ, Keates S, Ahmed S. Investigating perceptions of manufacturers and retailers to Inclusive Design. The Design Journal 2004;7(3):3-15

17. Goodman J, Clarkson PJ, Langdon P. Developing Tools for Communicating Inclusive Design Principles. In: Promoting User Sensitive Inclusive Design: Strategies for Communicating User Needs to Designers, workshop at ADDW 2005. Dundee, UK; 2005

18. Goodman J, Dong H, Langdon P, Clarkson PJ. Industry's response to Inclusive Design: A survey of current awareness and perceptions. Proceedings of Ergonomics 2006, Cambridge, UK; 2006; pp 368-372

19. Goodman J, Dong H, Langdon P, Clarkson PJ. Factors involved in industry's response to Inclusive Design. In: Clarkson PJ, Langdon P, Robinson P, editors, Designing Accessible Technology. London: Springer; 2006; pp 31-39

20. Foresight. The Age Shift – Priorities for action. Ageing Population Panel; London: Department of Trade and Industry; 2000. Available from: www.foresight.gov.uk; accessed June 2, 2006

21. Coleman R, Dong H, Topalian A. The business case. In: Design for Inclusivity. Hampshire, UK: Ashgate Publishing Ltd.; 2006 (in press)