



## BEST COMPANIES - METHODOLOGY

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## 1. Introduction

### 1.1 The purpose of this published methodology

Best companies Ltd. made the decision to publish its methodology in 2006. The original intention of this document was to be a guide to potential users of the survey giving a clear picture of how their organisations' data was collected and analysed and the reasons for the particular format of the survey. We were aware at the time of the conflicting interests for a private company publishing its intellectual copyright. However, we believe that it is the right of anyone considering paying for a service to know in advance at least the outline if not the full detail of what they are paying for. The original methodology description was not intended as a full and scientific analysis of the survey instrument. We wanted to make the document readable to a general audience as a guide. Following feedback from the original document this update goes further in explaining the theoretical background and statistical testing of the factor model and the details of the scoring questions. At the same time we have tried to maintain readability by putting statistical detail in appendices.

Best Companies mission statement is "To help make the world a better workplace"; we publish our methodology in the full knowledge that it may be used as a guide for companies to develop their own surveys. We are happy for it to be used in this way if it enables more valid and reliable surveying within organisations. However, the individual questions which we have spent years developing are protected by laws of copyright and must not be copied and used by other people or organisations. We hope that it will be understood that there are good reasons for not publishing some details of our methodology. For example, we do not publish a full list of the scoring questions; some questions may be used as feedback, as test questions, for cheating checks or for internal consistency checks. To publish full details of these might weaken the survey process. Given this caveat it is our intention to be as open as possible in describing our methodology.

We are not aware at the present time of any other surveying companies who publish their methodology but we strongly encourage them to be as open as possible in what sometimes can be a rather secretive field.



## 1.2 History and theoretical background

The Best Companies original workplace engagement survey was researched and developed by academics from the University of Plymouth and a consultancy team with more than 60 years of research expertise between them. It also benefited from advice from the DTI whose business research background is immense. We are very proud of the endorsement of the Sunday Times and the DTI for our process; they have both shown a strong interest and support for the development of our methodology for which we thank them. In fact the DTI sponsored much of the early development of the methodology with “pump-priming” funding and were actively involved in giving some very useful advice and encouragement.

We are aware that some companies in the field of measuring employee engagement recommend defining an initial model and then statistically testing this pre-defined model. However, we do not believe this to be the best approach in the absence of a consensus model; this point is discussed in more detail later in Section 3.1.

The Best Companies approach is in fact the most rigorously scientific approach to this problem. The first stage was to use a literature review and extensive professional business and research experience to identify all the potential drivers of employee engagement. Survey questions were developed to test all these potential areas. These were then piloted on 20,000 employees and the first Best Companies engagement model was formed from those factors which were statistically significant in the measurement of employee engagement. The initial pilot questions were structured in themes and those which did not stand up to statistical testing were not included in the model. The model thus formed was then statistically tested for fit using Confirmatory Factor Analysis. However, we realise that no scientific model is ever final or perfect, constant testing will allow for improvement and refined accuracy. This is why we retain free space in the survey for new test questions every year. Over the last five years we have tested and re-tested potential improvements to the model. Up to the current date (July 2008) the model has been tested on more than 700,000 UK employees and each year the statistical strength of the model has been improved. Through this year on year testing of many alternative questions we have been able to refine the accuracy of the survey measure and improve question wording and factor strength, however, the eight factor model has remained robust. Thus, we do not claim that ours is a final and definitive model, simply that it is the best and most robustly researched to date.

The statistical fit indices for the Best Companies model and reliability statistics for the factor constructs are given in Appendices 1 and 2. They demonstrate an excellent model fit and reliable factor constructs. We are confident that our model of employee engagement is



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more scientifically rigorous and has been tested on more employees than any other comparable model.

This document explains our survey methodology in detail, both for the creation of the Sunday Times lists and for the Best Companies Accreditation system. In order to answer the many questions we receive on the subject and explain why we use this particular methodology we have included a brief description of the general issues involved in producing a survey which can be used as a valid measurement. There are literally thousands of academic books and journals on this subject. We have chosen the ones referenced and recommended here because we believe they are generally accessible to people wanting a more detailed introduction to the academic background of this research area. The references in the text are given in full in the reference section at the end.



## 2. Surveying employees

This section describes the general process of developing the Best Companies survey and the checks involved in guaranteeing reliability and validity of survey measurement.

### 2.1 Choosing a survey type

The initial stage in developing any survey is to choose the question type and the response scale on which the questions will be measured. The Best Companies employee survey is based on a Likert type scale. The Likert scale is the most highly researched and used scale in the social sciences and has a number of advantages over other scale types (See Alreck and Settle, 1995. Page 116).

Although the items in the survey are generally referred to as “questions” they are in fact a series of statements, for example, “This is my dream job” and respondents answer them by selecting from an Agree/ Disagree response scale. The Best Companies survey uses a 7 point response scale;

Strongly agree

Agree

Slightly agree

Neither agree nor disagree

Slightly disagree

Disagree

Strongly disagree

Often this type of survey uses a five point scale with the “slightly” categories removed, but we find 7 points gives us a greater granularity of data and gives the employees responding a greater choice. Some researchers in the field have a preference for “forced choice scales”. These are even numbered scales (usually 4 or 6 responses) which do not include the “Neither agree nor disagree” option. Without this option respondents are forced to take either a positive or negative stance on every question. Whilst this makes it easier for researchers, who do not then have to deal with indeterminate data, it makes it more difficult for those people answering the survey if they really do not have a point of view on the question. Adding difficulty for the respondent can cause many issues from not responding at all to giving invalid data and for these reasons we do not use a forced choice scale. For further discussion of the forced choice issue and the resulting biases see, J.J. Ray (1990).



The advantages of the Likert type survey with statement and agree/disagree response scale are well described by Alreck and Settle, (1995), Page 116, these advantages include;

- Power – The scaled response gives granular data in a powerful format for analysis
- Simplicity for respondent – The response scale is consistent and understandable no matter what the question type and there are no complex instructions for completing the survey
- Flexibility – The statement format of questions does not restrict the type of question which can be asked
- Economy – Question statements can be short and to the point
- Comparability – All responses are on the same scale and thus directly comparable statistically
- Summated values – While the response scale is strictly categorical in nature, it does have a clear scale value of increasing positivity and thus score values can be summed or averaged across respondents
- Years of background research – As the standard survey method in the social sciences the issues with statistical analysis and validity of results are very well known

## **2.2 Employee comments**

From the beginning of the Best Companies employee survey we have collected employee comments in a section on the back page of the survey. The format of the comments section has always been open and non compulsory. Employees can write what they want here and we have found this to be a very valuable source of data. However well developed, no survey can be perfect and cover every issue which might arise in every workplace and this section gives employees the chance to give direct feedback on what is important to them.

The value of this data for specific organisation feedback is obvious but it is also a very useful source of information for development of the survey. Through analysis of the comments it is possible to track current and emerging issues and to update the survey to include those things which are important issues to employees.

## **2.3 Employee demographic information**

The Best Companies employee survey also collects detailed demographic information on the respondents.



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The current companies' employee survey asks questions on;

- Job grade
- Employment Status – Full or Part time
- Hours worked
- Sex
- Graduate appointment
- Age
- At home – Living with partner and dependants
- Salary band
- Working from home
- Years of service
- Employment group – Defined by organisation
- Job role
- Regional location

This data is used in a number of ways;

When reporting back to organisations the Best Companies "Workplace Insight Tool" (WIT) allows both factor and individual questions scores to be broken down by the demographic categories (See section 7 for details). We find this is invaluable in tracing the drivers behind both good and bad organisational scores. The Employment Group demographic is defined by each individual organisation entering. This choice gives organisations a bespoke data breakdown which can be extremely valuable if employment groups are chosen well. Best Companies staff are happy to give advice on choosing these groups. There is necessarily a limit to these breakdowns, Best Companies guarantees the anonymity of individual responses and because of this we will not report information from any demographic group with less than 6 members. The importance of anonymity is discussed in Section 4.6 below.

Demographic data is also used to guarantee that the random sample of employees selected to complete the survey accurately represents the real demographic breakdown of the organisation. The overall organisational demographics listed in the company survey are compared with the returned employee survey demographic spread in an automatic computerised process which flags Best Companies staff if imbalances in sampling occur. Any issues arising from this check are then investigated on an individual basis. (Also see – Cheating checks, Section 4.5) Demographic data is also used to check for potential bias in the survey questions, see Section 2.4 below.



## 2.4 Developing questions – the issues

The process of developing survey questions is complex and there is an immense amount of academic research in this area. Because valid question development is crucial in producing valid and reliable data, and because we are often asked why it is not possible to just add other questions to our survey, this section will describe the main points which need to be considered in question development. However, this is not an exhaustive guide to the process and it is not possible here to describe the solutions to these issues. We would recommend that people developing surveys of their own refer to the extensive literature in this field. Sudman and Bradburns (1982) "*A practical guide to asking questions and questionnaire design*" is a good starting point for anyone interested in developing their own survey, as is Fowler (1995) "*Improving survey questions; Design and evaluation*".

Developing good survey questions depends first on having a good background knowledge of the area and issues you want to measure. This expertise will direct you to the sort of questions you want to ask, the process from there is mostly one of refining your questions to avoid the known sources of bias. The wording of questions is crucial and changing a single point of either content or context may introduce a bias into the answers. Known and well researched response biases in the literature which must be taken into account include the following;

- Knowledge – It is surprisingly easy to ask a question for which the target respondent will have to guess the answer. This can be acceptable if your survey is aiming to measure opinion rather than fact but great care in interpreting responses will be needed. For example, "My boss likes me", will tell you what people think their boss thinks, but not actually whether their boss does like them. Other examples are, "I would be happier working in a smaller team", "I will still be in this job next year", etc. which ask respondents to speculate.
- Leading questions – For example, "I am still unhappy here" – Agreeing means you are unhappy, disagreeing means you were unhappy but it is better now.
- Definition of concepts – Complex or easily misinterpreted concepts will cause bias.
- Clarity of language – Complex or easily misinterpreted language will cause bias. There are in fact tables of the frequency of word use in the English language which can be referred to by survey designers to avoid potential biases. See Broadbent, (1967) *Word frequency effect and response bias*.
- Culturally loaded language or concepts which will produce different responses from different cultural groups.



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- Single question – Any question must ask about only one concept. For example, “I am happy with my pay and working hours” is unanswerable if you are happy with one and not the other.
- Social desirability of response – questions with any element of social desirability for a particular response will cause bias.
- Acquiescence – There is a tendency for respondents to want to cooperate, the questions must avoid implying a questioners preference. (Also see, Anonymity Section 4.6 )
- Yea and Nay saying – Research has found that people have global tendencies towards either positive (Yea sayers) or negative (Nay sayers) responses. When all the questions in a survey are either positive or all are negative this tendency introduces bias.
- Prestige – Questions implying prestige from a particular answer will cause bias.
- Threat – Questions which imply an element of psychological threat will cause bias. This is a particular problem for in-house surveys where employees may perceive loaded questions from their bosses.
- Hostility – When asking a lot of questions it is surprisingly easy to create a feeling of hostility in the respondent (Who are they to be asking me all these personal things?). The generation of hostility will cause bias in all the remaining questions. This issue is important not only for question design but also in the explanation and instructions given to respondents. Hostility will be a much greater and sometimes insurmountable issue for non- anonymous surveys or for internal surveys where the motives of the questioner are not trusted. (This also applies to perceived threat – See above)
- Mental set – When asked to do any mental task people develop perceptions and assumptions for the task they are about to perform. Clear and accurate instructions are crucial in setting up a neutral mental set and this neutral set needs to be maintained with consistency between the instructions and the questions asked.
- Extremity of response – questions should be designed to match the response scale. Extreme questions, e.g. “I absolutely love every single minute of my working life” will reduce the possibility of respondents using the whole response scale.

The Best Companies employee survey questions are designed as far as possible to avoid these potential biases. However, no question designer can be certain of having taken everything into account the first time round. This is why it is crucially important to statistically test all questions for biases on a large and diverse population of people before accepting questions (See Section 3) and to have a development process with repeated surveying and testing leading to constant refinement (See Section 2.6).



The way the questions are presented within a survey has also been shown by research to have the potential for bias. The Best Companies survey is structured with both positive and negative questions with a mix of subject matter to prevent response biases. Completing surveys and reading each question in detail is a mental task and research has shown the tendency for fatigue or simply ease of completion to create "Response Contraction". This bias occurs when all questions have the same polarity and therefore can all be answered in the same way by ticking the same box all the way down column of questions. Response contraction can be recognised when the answers to questions appearing earlier in a survey are spread across the range of responses but later questions all receive similar scores. Response Contraction is a named bias because it is such a significant problem for surveys containing only positive (or only negative) questions. Response Contraction worsens where questions are presented in meaningful groups, for example, a block of questions relating to Leadership. In these cases respondents rapidly develop a point of view on the whole subject area (e.g. Leadership) from the initial questions and then save effort by continuing the same or very similar responses for the rest of the block.

Response contraction has been described here because it is a major effect of question context. However, there are also numerous other potential biasing effects relating to survey content and context which it is impossible to detail in this document. For those interested, Tourangeau, Rips and Rasinski. (2000) *The Psychology of Survey Response* is an excellent introduction to the area.

## 2.5 The Best Companies question development process

All survey developers will try their best to avoid questions which will produce the sorts of biases listed above. However, the only way to truly know if a question produces biased responses is to statistically test questions on a large sample of people and then reject those questions which show biases or produce weak data. In 2001 at the beginning of the Best Companies methodology development, a range of 134 questions were generated and tested in an extensive piloting process. All these questions were then statistically tested. It is worth noting that in hindsight once the distribution pattern of a question has been analysed it is often easy to see where the wording has introduced a bias and questions can often be re-worded and re-tested rather than being rejected outright.

Exploratory factor analysis (See section 3.2.1) of the results from accepted questions showed eight distinct factors which reflected different facets of the workplace. Factor analysis results give extensive data on the quality of questions and from this process 65 questions were retained which best discriminated workplace experience. These 65 questions were used in the



initial employee survey for the 2002 Sunday Times "Best Companies to Work For" list. Once the initial 20,000 survey results had been collected a second Exploratory Factor Analysis (EFA) was run. This confirmed the question accuracy and the validity of the eight workplace factors. The second stage of the survey question analysis was the completion of a Confirmatory Factor Analysis (CFA) (See section 3.2.2) using the 50,000 survey results collected in this year. The results again confirmed the validity of the original eight factors. At this stage the statistical analysis for this year was complete and some of the questions were reassigned to factors in which they had a stronger weighting. Nine questions were dropped from the list factors at this stage; generally this was where two questions were very strongly correlated (i.e. asking the same thing) also a few questions with low factor weightings were dropped (a low factor weighting in the analysis implies that the question does not measure a concept well). The factors were named in line with the specific make up of the questions for which they had the highest factor loadings.

Since the initial development of the methodology described above we have repeated the statistical testing of the survey questions on each year's new data. This has effectively given us six totally independent statistical analyses of the survey materials and at the present time (2008) we have surveyed more than 600,000 employees from all varieties of UK workplaces.

This gives us an immense amount of information on the questions we ask and enables us to be certain that we do not have response biases across any of the demographic groups we measure, for example, male/female, different age groups, graduate and non-graduate appointments, job grades, etc. (Note – The early surveys asked demographic questions which included cultural background, responses to survey questions were checked across these demographic categories for evidence of cultural biases. As we never found any cultural biases in the survey question format or in responses this demographic was later dropped). We also check question distribution patterns, potential order effects, inter-question correlations and question - factor loadings every year. At this stage the demographic information may be used to identify questions which show a bias for specific demographic groups. These are checked specifically to avoid those potential biases which are harder to measure, for example the induction of threat or hostility, etc. (See section 2.4).

## **2.6 Year on year survey development**

Because no survey is a perfect measure of a persons experience or feelings and because workplace issues and interests change over time, the survey is in a constant state of evolution and development. To handle the necessary change whilst maintaining the reliability and



validity of the survey questions we have developed a two year rolling process of survey development.

The current survey now contains 66 employee engagement questions. In any one year roughly 54 of these will be scoring questions. All these scoring questions will have appeared and been statistically tested in the previous years survey. This leaves us with a number of free questions, a few of these are available to be used as "interest" questions or consistency checking questions and these are used in our internal research. The remainder of the free questions are present as test questions. These questions run through the full survey process in the year they are introduced but are never used for scoring in that year. We will not use a question for scoring unless it has been fully analysed. Firstly, new questions are tested for the presence of possible biased responses. If they pass those tests they are then tested against the current questions in the Exploratory and Confirmatory Factor Analysis process (See section 3.2). If a potential new question is found to have higher accuracy than a current question, or to accurately measure an area which had previously been deficient in the survey, it will be introduced in the following year. This two year rolling process gives us the advantage that we never have to introduce a new question without it first passing all the test criteria. An additional advantage is that for any given year we can supply organisations with exact year on year data comparisons. For example, an organisation looking at their 2007 results on the Workplace Insight Tool (WIT) will be able to compare their results with the exact 2006 equivalent. Because any new scoring questions for 2007 were necessarily present in our data files (as test questions - not scored) in 2006. The online Workplace Insight Tool (WIT) has the facility to present the previous years scores for any new questions and also to back calculate what an organisation's factor results would have been in the previous year using the new question set. Thus, this two year rolling process of development allows for change whilst retaining the ability to produce exact year on year comparisons.

### **3. Developing a theoretical model of employee engagement**

#### **3.1 Introduction and History**

Although there is extensive research in the area, there is currently no existing consensus model of employee engagement. Where there is no consensus model the normative approach to model development is to observe and measure all potential areas first and then form your model based on the results. Following an informed reading of the relevant literature a wide ranging pilot survey was constructed to cover all the relevant possible factors relating to employee engagement. This pilot survey was statistically tested and those questions best fitting employee engagement were retained



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We are aware that some companies in the field of measuring employee engagement recommend defining an initial model and then statistically testing this pre-defined model. However, we do not believe this to be the best approach in the absence of a consensus model. To form a theoretical model first and then collect data second will necessarily lead to you only finding answers which fit the model you guessed at in the first place. For example, if you were to first decide on an employee engagement model which contained leadership, management practices and pay and benefits, you would then create survey questions in these areas. When you statistically tested the model items you would find that the results supported your experimental model (i.e. the experimental hypothesis is true). The findings would support your experimental model because these three factors are related to engagement. However, the overwhelming problem with this pre-defined model approach is that you haven't tested any other potentially related factors. So all you have in fact discovered is a limited incomplete model which is missing other relevant factors. (E.g. Team work, giving something back, etc.) Any confirmatory research based on a pre-defined model would suffer from this limiting problem. Thus where there is no existing consensus model the appropriate research paradigm is necessarily exploratory.

The first stage of the Best Companies approach was to use a literature review and extensive professional business and research experience to identify all the potential drivers of employee engagement. Survey questions were then developed to test all these potential areas. These were then piloted on 20,000 employees and the first Best Companies engagement model was formed from those factors which were statistically significant in the measurement of employee engagement. The initial pilot questions were structured in themes and those which did not stand up to statistical testing were not included in the model. This is, in fact, the only scientific way to develop an initial model where there is no existing consensus model and is exactly what the statistical approach of Exploratory Factor Analysis was designed to do (thus the name). The model thus formed is then statistically tested for fit using Confirmatory Factor Analysis (this further analysis being again exactly what this statistical method was designed to do). Some researchers would be content to stop at this point and publish the model as a final model of employee engagement. However, we realise that no scientific model is ever final or perfect, constant testing will allow for improvement and refined accuracy. This is why we retain free space in the survey for new test questions every year. Over the last five years we have constantly tested and re-tested potential improvements to the model. Up to the current date the model has been tested on more than 600,000 UK employees and each year the statistical strength of the model has been improved. Through this year on year testing of many alternative questions we have been able to refine the accuracy of the survey measure and



improve question wording and factor strength, however, the eight factor model has remained robust. Thus, we do not claim that ours is a final and definitive model, simply that it is the best and most robustly researched to date. This factor model of employee engagement is now quite highly developed and gives a unique insight into those things in the workplace which are of most importance for engaging employees. The model has been created using factor analytic techniques which are explained very briefly in the next section. The important point of this technique is that it is entirely objective. The factors in the model are totally derived from the employee data with no personal subjective input. Thus, the factors in the model (Leadership, Wellbeing, etc) are derived purely statistically from those things which employees score as most important to their engagement. These engagement factors were not “thought up” by Best Companies staff, or any external experts, they are a research finding from the data and as such are the factors 600,000 UK employees are telling us are most important to them.

(The statistical fit indices for the Best Companies model and reliability statistics for the factor constructs are given in Appendices 1 and 2)

### **3.2 The use of factor analysis in modeling data**

In this section we hope to give an account of the factor analysis used in Best Companies research which is as non-technical as possible. For those interested in the technical details we recommend Paul Kline (1994) *An easy guide to factor analysis* and Dennis Child (1995) *The essentials of Factor Analysis (2<sup>nd</sup> edition)* both these books give good introductory overviews of the statistical techniques.

Factor analysis is a statistical technique that originated in psychometrics. It is used in the social sciences and in marketing, product management, operations research, and other applied sciences that deal with large quantities of data. Factor analysis is a powerful multidimensional statistical tool which is used to examine the interrelations among a set of variables, or items, in order to identify their underlying structure. There are two basic forms of Factor analysis which are both used in developing the Best Companies workplace engagement model;

- Exploratory Factor Analysis. This method has no preconceived factor structure and the analysis is used to identify common underlying constructs among a group of variables.
- Confirmatory Factor Analysis. In this analysis an underlying causal structure is hypothesized and structural equation modeling is used to test the accuracy of the hypothesis.

Best Companies research first used exploratory factor analysis to discover those areas (factors) which employees score as most important to their engagement. This process led to



the discovery of the Best Companies factor model of employee engagement. Secondly, confirmatory factor analysis was used to develop and refine this model with new survey questions.

### ***3.2.1 Exploratory factor analysis technique***

Factor analysis is a powerful statistical tool which gives us an orderly simplification of a number of interrelated measures. Exploratory factor analysis has no preconceived factor structure and the analysis is used to identify common underlying constructs among a group of variables. This is the best starting point to model survey data as the resulting model will not be biased by the researcher's ideas of what they might be looking for. Essentially all data is put into the analysis with no limits set for the sort of output which is expected. The process of analysis can be imagined as a process of diagnosis. You have collected information which is like a large number of symptoms; you need to form these into meaningful groups to diagnose the underlying state of health or illness. A group of variables (in this case responses to survey questions) which have a great deal in common constitute a Factor. So, for example, a group of questions which are all asking something about the concept of leadership may form a leadership factor. If this is the case, then firstly the results imply that the respondents to the survey (employees) answer this group of questions differently from the other survey questions, and secondly, the score for this factor will tell you something meaningful about how your employees regard the state of health of the leadership of your organisation.

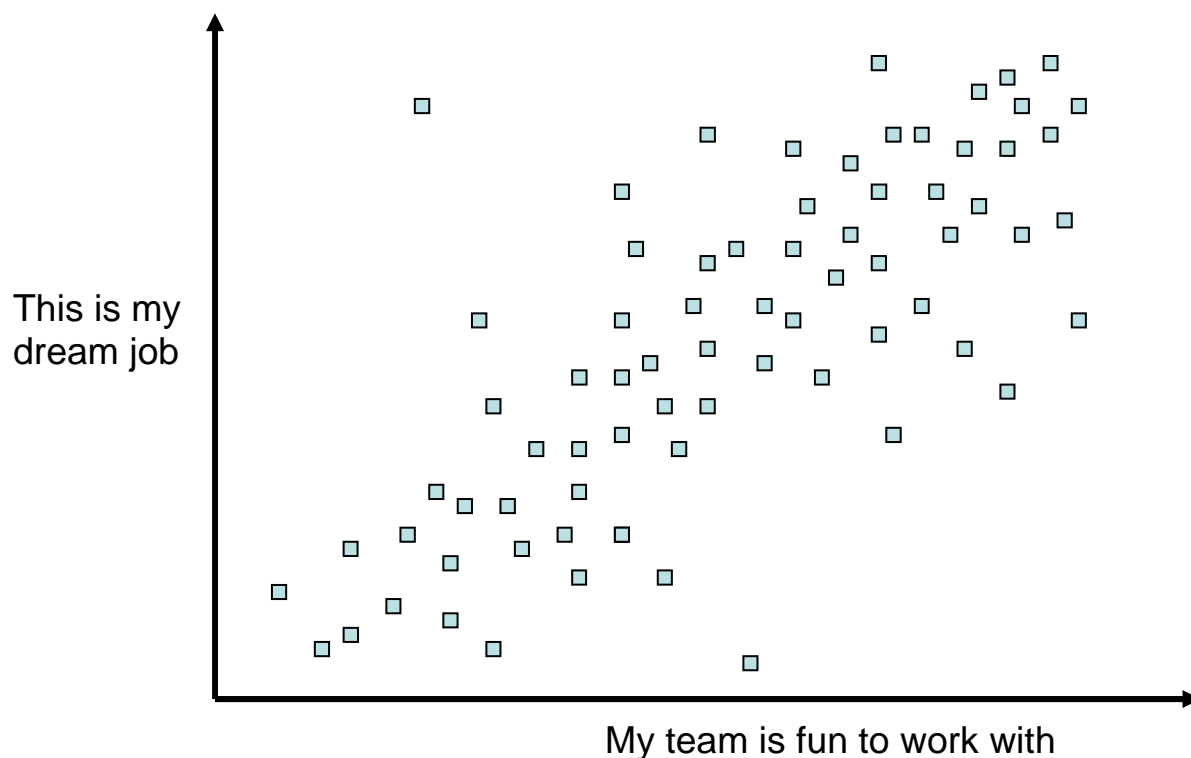
The theoretical idea of factor analysis is old. It was originally theorised by Galton around the beginning of the 20th century. The theory was further developed more recently by Cattell to explain the different factors underlying intelligence. However, it was not until recent advances in computing that it has been practical to analyse large data sets. The statistical application of factor analysis for modeling large data sets is still a cutting edge process. To get an idea of the mathematical complexity of factor analysis; the Intel Pentium IV chip performs 42 million calculations per second, the more complex factor analyses performed on the Best Companies research data set can take up to 10 hours of computer time to run.

Factor analysis is an analysis which is performed in a multi-dimensional mathematical space and as such is extremely difficult to describe without resorting to complex mathematical formulae. However, it can be partially imagined graphically; if we first consider just two questions from the survey, we can make a graph showing how people scored on each of these questions.



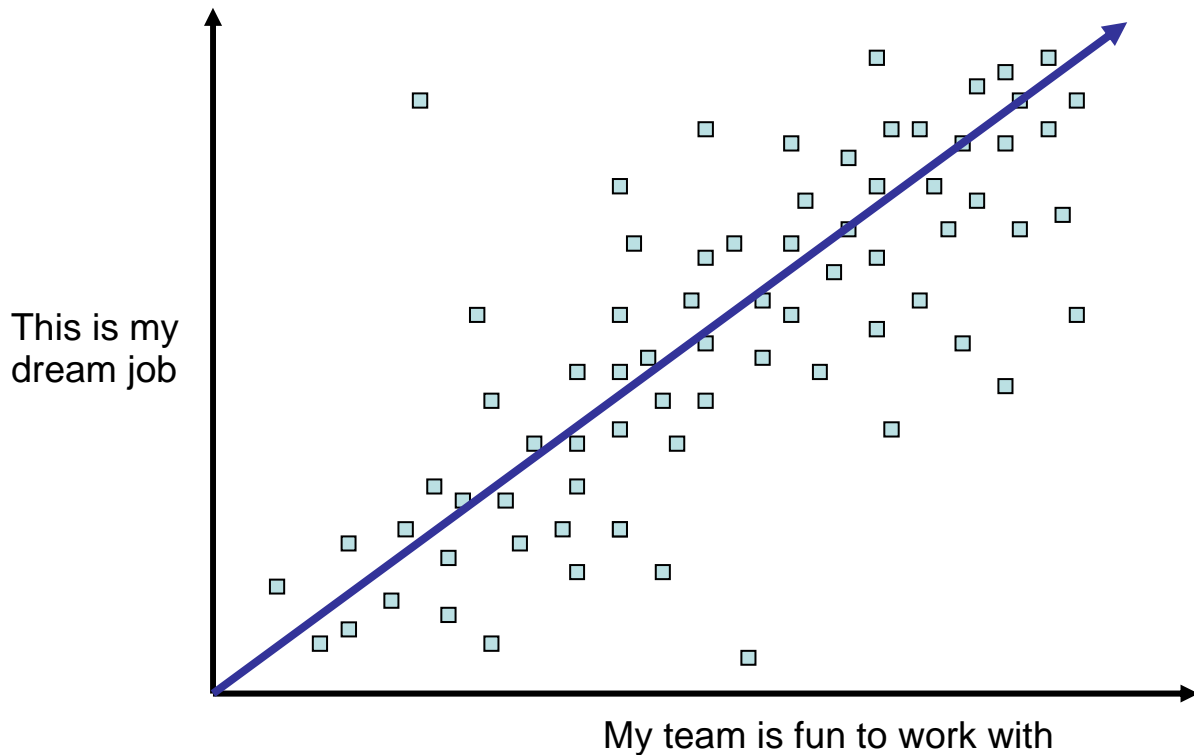
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### Two question scatter graph



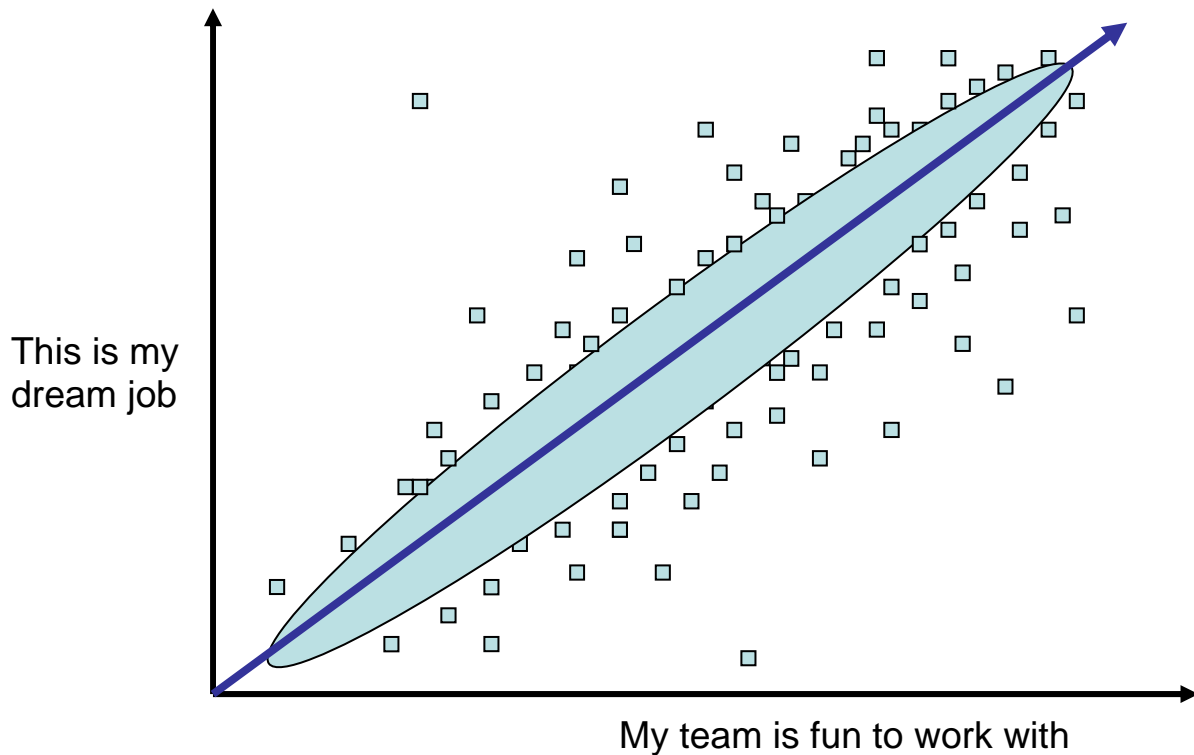
Each point on the graph shows one persons score on each of the questions. Points further to the right on the graph reflect higher scores on "My team is fun to work with". Points higher up the graph reflect higher scores on "This is my dream job". To simplify the graph we have just included a few of the data points, but even with this small amount of data it is possible to see that there may be a relationship between the answers to the two survey questions. In general people with high scores on the question "This is my dream job" also have high scores on "My team is fun to work with" also generally people with low scores on one also have low scores on the other.

## Two question scatter graph with vector



This relationship between these two questions is known as a correlation and this correlation can be represented by a line known as a Vector. Thus, a Vector is a line which describes the relationship between 2 questions. If we can draw a vector which is close to all the data points it will describe the relationship well. At this point we can't be sure how well this vector describes the relationship as we still don't have many data points and some of them are a relatively long way away from the line.

## Two question scatter graph with vector and added data

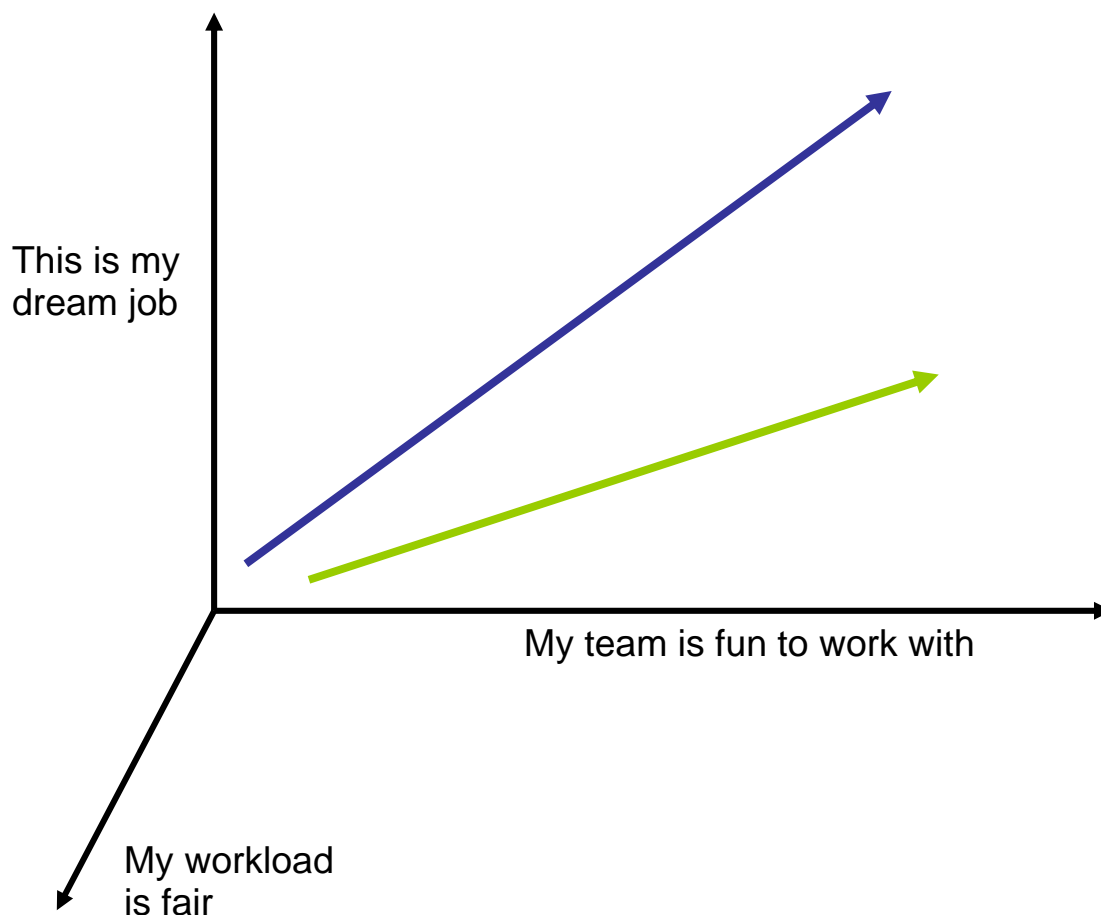


When we add more data (imagine the centre area of the graph filled with 85,000 data points from one year of Best Companies research) we begin to be more confident that our vector is a good description of the relationship between these 2 questions.

Here we see the importance of collecting a large data set for the accuracy of the modeling process. Had we stopped collecting data at the position of the previous graph, where we had about 70 responses, we would still be uncertain about the accuracy of our vector. Now with 85,000 responses we have a very high level of certainty that the vector is accurate. Accuracy at this early stage is fundamental to the subsequent development of a reliable workplace engagement model. This is a particularly important point; the statistical reliability of any analysis findings are absolutely dependent on numbers of people surveyed. In our initial exploratory factor analysis we used 20,000 employee responses which we considered to be an absolute minimum for an analysis of this complexity. We have subsequently retested on more than 700,000 employee responses to date.

## Three question vector graph

The next stage adds complexity as we begin to include data from the other survey questions into the analysis. This can be visualised by adding a new axis to the graph for a third question at right angles to the axes for the first 2 questions. Imagine the graph below is now in three dimensions and the new question axis (My workload is fair) is coming out of the page. The original vector in 2 dimensions (Vector 1) is shown as is a new three dimensional vector (Vector 2) which describes the relationship between all three of these questions.



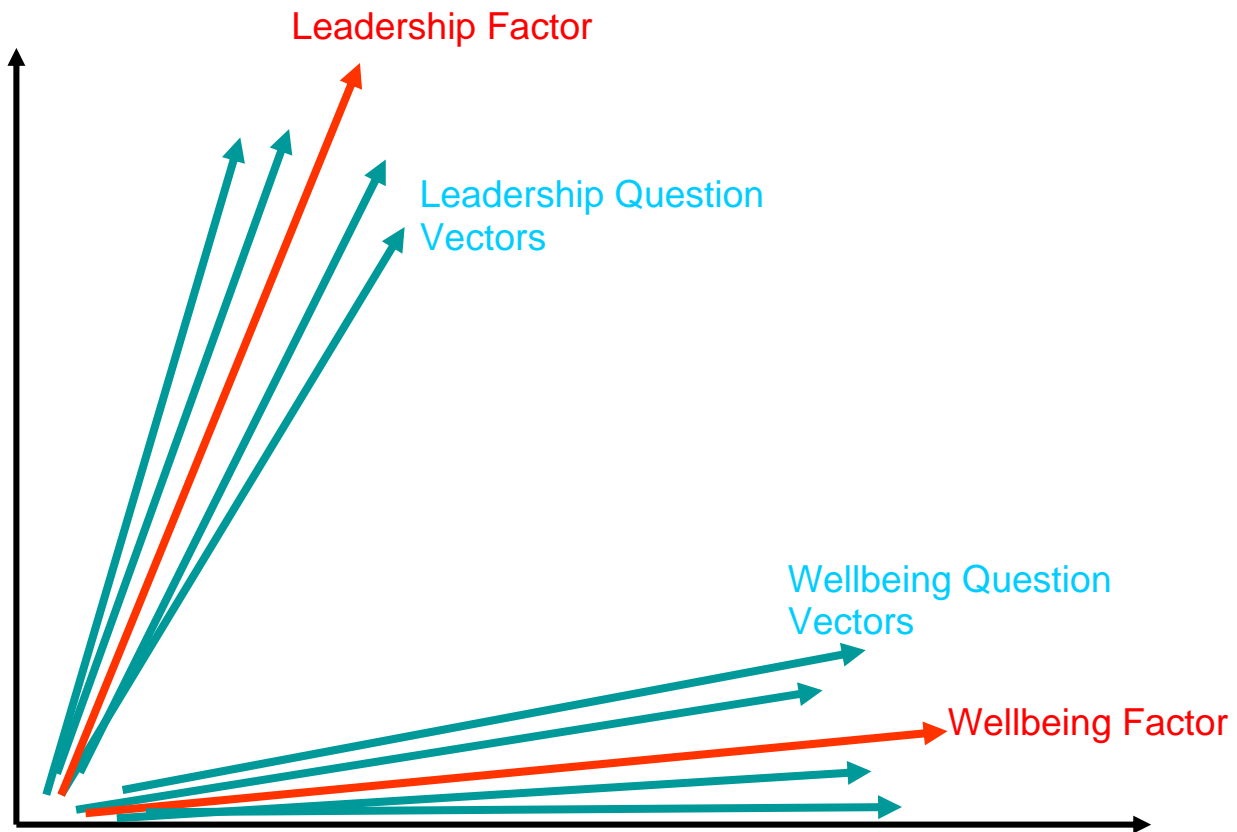
From this point the factor analysis will add in a new axis at right angles to these three questions to include the data for a fourth question from the survey. However creating a visual image of this stage and further stages of the analysis is impossible as the subsequent analysis takes place in a multi-dimensional hyperspace. Whilst this is visually impossible to represent it is not a problem mathematically for the advanced software programs which perform factor analysis. The analysis will keep adding data from new questions and create new vectors in new



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dimensions to eventually form a picture for all the items in a multi-dimensional hyperspace which contains vectors describing the relationships between all of our survey items. The analysis next compares the vectors in hyperspace trying to fit factors to groups of questions. The computer program will test millions of possibilities until it finds the group of factors which best describe the data. A factor is formed where a group of variables have a great deal in common. Commonalities between items are reflected by the closeness of their vectors. So where there are a group of questions whose vectors are close to each other a factor is created which best describes this group of questions. Although we should remember this process happens in a complex hyperspace we can roughly represent the results in two dimensions.

## Graphic Representation of Vectors and Factors



In this picture we can see the Leadership and Wellbeing factors in red each surrounded by their group of related questions. The output results of the factor analysis give us a wealth of detailed information. Specifically, figures relating to the makeup and strength of factors, the statistical weighting of each question on each factor and the relationship (correlation) between factors. This statistical information tells us a great deal about the factors which underlie our data and allows us to form a first model of workplace engagement.

In the graph example above the two factors are both strong factors. The strength of a factor is defined by how closely the questions group around it. In the diagram above it is possible to see that the question vectors group closely round the factor line. A weaker factor would have a wide spread of question vectors. How closely a question is related to a factor is recorded in the



factor analysis output as the question factor weighting. This value is roughly on a scale of 0 to 1 and normally a value of above 0.3 is regarded as a significant relationship. As an example of Best Companies results in this area questions in the 2007 factor analysis had an average factor weight of 0.74.

The graph example above also shows that the factors are discrete. That is, the factors are measuring conceptually different things. This is represented by the fact that there is no overlap between them or their vectors. If the factors were measuring similar or related concepts they would be closer together and might share question vectors equally between them. This is an important measure from the factor analysis for data modeling but also for question validation. If a question is found to weight strongly on two different factors at the same time then it is probably not a good measure of either. This type of question would be dropped in the question validation process.

The factor analysis results also give measures of question to question correlation and these are also used in the question validation process. If two questions are very highly correlated then they will be essentially measuring exactly the same thing and one of them will not be necessary. This would be shown in the graphical representation as two question vectors exactly on top of each other. (In the analysis sharing the same place in hyperspace). So whilst we are looking for questions which measure the same area (high factor weighting) we do not want two of them to measure exactly the same concept (high question to question correlation). For example, the questions "My manager helps me to fulfill my potential" and "My manager cares about me as an individual" both have weightings of 0.85 on the My Manager factor showing them to be extremely good measures of the factor (question vectors close to the factor vector). Their correlation with each other is much lower at 0.66 showing that they are measuring different areas of experience with managers (question vectors not in the same space).



### **3.2.2 Confirmatory factor analysis technique**

Confirmatory factor analysis operates functionally in a similar way to exploratory factor analysis. However, as its name suggests this technique is used to confirm that a known model is the best model to fit the data. In this case information about the factors, their number and which items are relevant to each is programmed in as a model before the analysis begins. This has some advantages in statistical power and forces us to think carefully about the structure of the variables within our model. It also allows us to test changes and refinements to the model so that it can evolve rather than remain a static description of the workplace at the time of the first survey. Confirmatory factor analysis produces a very high level of statistical output measures including measures of model fit, factor strength, question weightings, residual variances (the proportion of data not explained by the factor model) and even produces data suggesting the possible effects of model modifications. Details of the excellent model fit statistics for the 2008 factor model of employee engagement are given in Appendix 1.

The Best Companies factor model of employee engagement was initially created with exploratory factor analysis and then checked and refined with confirmatory factor analysis. Each year as new data arrives both these analyses are repeated and new questions checked. Each year we have confirmed that our factor model is the best available to fit the data and have improved the question set for more accurate measurement. No model will ever be perfect, the challenge for us is one of constant exploration.

### **3.3 The Best Companies factor model of workplace engagement**

As described above, exploratory and confirmatory factor analysis were used to identify groupings (factors) within the survey items which represent those areas which have most impact on employee engagement. The results of this analysis produced eight discrete factors. These factors have been tested and retested over the last five years of data collection and all statistical tests show them to be a valid and very reliable model of the areas with which employees are most concerned. It is worth clarifying that these factors were not predetermined or chosen by Best Companies or by “experts” but were entirely data driven. As such we are confident in the research finding that these factors represent those areas which employees report as necessary to their workplace engagement.

The eight workplace factors determined within this research and used as a top level description of data results by Best Companies Ltd are as follows;



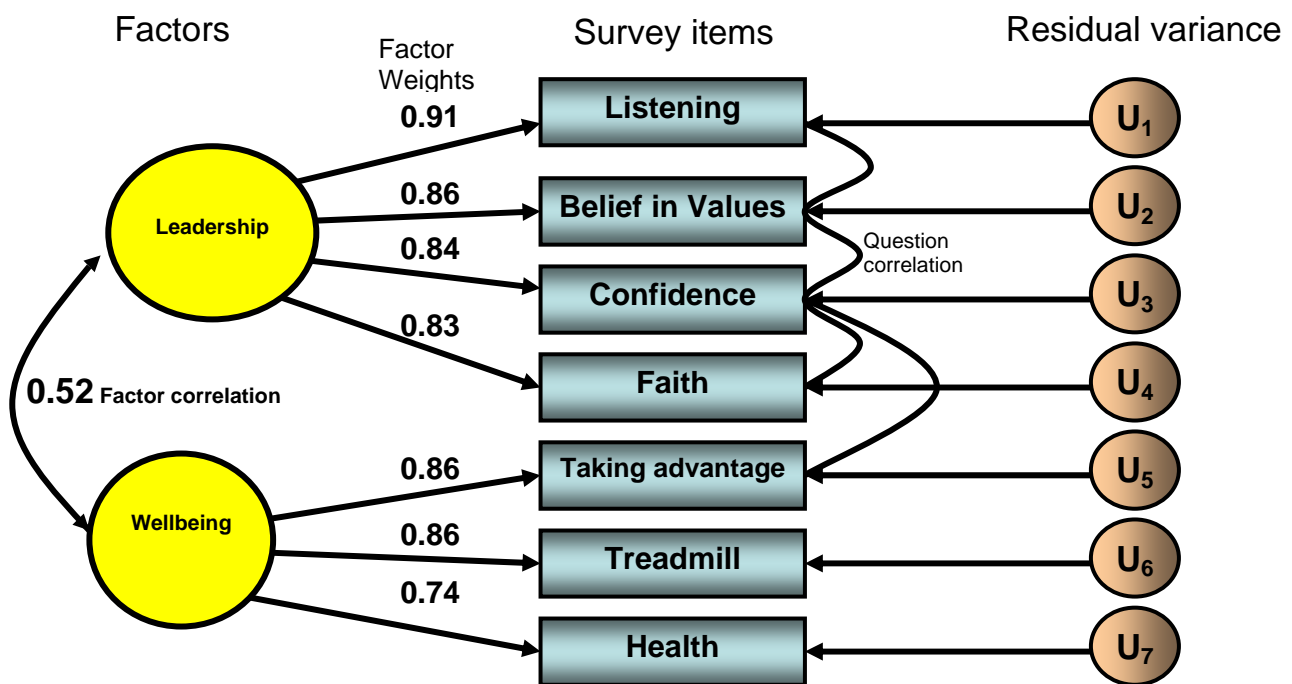
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- **Leadership** measures how people feel about the head of their organization, the senior management team and organisational values
- **Well Being** measures stress, pressure, the balance between work and home life and the impact of these factors on personal health and performance
- **My Manager** measures whether people feel supported, trusted and cared for by their immediate manager
- **My Team** includes encouraging team spirit, feeling part of the organisation, having fun, and belonging
- **My Company** focuses on how much people value their organisation, how proud they are to work there, and whether they make a difference
- **Personal Growth** examines whether people feel challenged by their job, whether their skills are being utilized and their perceived opportunities for advancement
- **Fair Deal** includes how well employees feel they are treated and how their pay and benefits compare to similar organisations
- **Giving Something Back** explores how much people think their organisation puts back into society and whether they believe this effort is driven by profit motives

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The diagram below shows a small part of the initial factor analysis model derived from 2005 survey data as a diagrammatic example of the level of data produced by the research. This example from our initial modeling shows the relationship and inter-correlations between survey questions and factors.

Partial Factor Analysis Workplace Model Diagram 2005



Survey items are shown in the centre in the rectangular boxes, it is the data from these which drives the whole model. On the left in the circles are the factors derived from the factor analysis. In between these are arrows showing the links between the factors and the items. These arrows are in the direction of causality. It is important to recognise that it is not the data from the items which causes the factors (although they are derived from that data) but in fact it is employees' attitudes to leadership which cause their responses to the leadership questions. Along with each arrow we have the factor weighting of each item. This shows the proportion of variance in the item scores which can be explained by the factor. Thus the differences in the responses to the listening question are roughly 90% determined by employees' attitudes to leadership. Where is the missing 10%?..... On the right in the small circles we have the residual variances. These are the variations in a question which are currently unexplained. This is the part of the data which is unique to that particular question and sets it apart from any of the other questions.



As described earlier, scores above 0.3 are usually seen as significant factor weightings, the model diagram shows very strong factor weightings for our survey items (actual values). This can partly be put down to good initial design and perhaps luck, but it is also a result of our evolution of the survey with constant development. Last years survey was better than the year before and we expect this years to be better again as we refine our knowledge base.

A model of the workplace engagement is only helpful if it's put to good use. The results from the Best Companies model are used as a research finding in their own right as well as to develop and refine the employee survey and to validate new questions. However, the most valuable use of the factor model is the structured feedback of survey results to organisations. This gives organisations a highly organised set of results structured around exactly those factors which are actionable in the quest for improvements in employee engagement.

### 3.4 Two-level factor analysis and the role of engagement

The eight factors described in section 3.3, generated statistically from the data, represent a useful tool for describing the top level results of organisations. However, within these factors there is a wealth of detail which represents further workplace constructs. For example, Leadership contains information on the leader, the senior management team and organisational values each of which can produce a separate measure. To further explore this wealth of detail, the Best Companies research team in association with Dr. Ian Dennis of the University of Plymouth, has performed a two-level factor analysis on what is now an extremely comprehensive database. Two-level factor analysis is a cutting edge statistical procedure which allows us to explore the variability in item responses both within individual organisations and between organisations.

This analysis statistically determines:

On one level – the drivers relating to **individual employees** which affect workplace satisfaction.

On the second level – the drivers relating to **organisations** and organisation culture which affect workplace satisfaction.

Two level factor analysis allows for the inclusion of data at the organisation level which includes data from the Best Companies company questionnaire. This allows us to analyse factors of organisation culture, organisation practices and organisation data such as holiday entitlement and absenteeism, etc. to search for potential drivers of employee scores.

The primary results of the analysis demonstrated the construct of "Employee Engagement" to be central to the eight workplace factors outlined above and to be an excellent measure of the



# Best Companies

performance of any given organisation. This result implies a direct relationship between levels of employee engagement and the survey results as measured by the eight workplace factors. As an example of this result, some of the survey items measuring employee engagement are listed in the table below along with figures representing their factor weightings from our original 2005 analysis on which our model is based. A factor weighting is a measure of how well an individual item relates to the construct it is measuring so, for example, a weighting of 0.96 represents approximately a 96% accurate fit between the item and the construct (in this case engagement).

*[Note: The standard level for acceptance of an item as a statistically significant measure of a construct is anything above 0.30 so all these items prove to be extremely good measures of engagement and the table shows these results are stable year on year]*

<b>Engagement (2004 and 2005 survey items)</b>	<b>2004 weight</b>	<b>2005 weight</b>
I love working for this organisation	0.96	0.97
I would miss this place if I left	0.96	0.97
I feel proud to work for this organisation	0.92	0.92
I feel I can make a difference in this organisation	0.84	0.81
I believe I can make a valuable contribution to the success of this organisation.	0.85	0.80

The question arises; "If employee engagement is a central factor in the measurement of workplace satisfaction then why is it not listed along with the eight Best Companies workplace factors?" The answer is that although employee engagement is an excellent measure it is not directly actionable. For example, responses to "I love working for this organisation" will tell you how your employees feel, however, if there is a problem in this area there is no clear action on how to improve. Compare this to, for example, a question in Leadership "Senior managers of this organisation do a lot of telling and not much listening" if there is a problem with scores for this question it is clear that strategies can be put into place to target improvement in this specific area of communication.

Factor analysis in itself does not imply causality, however, it is clear from the survey items that the eight workplace factors represent actionable areas where specific changes can be made and as such we would describe these as Input factors. By utilising the detailed results from these factors an organisation can input changes targeted at improvement. Employee



engagement is described as an Output factor because it specifically measures an employee response to the workplace but does not on its own suggest what input would affect this response. Because our research results place engagement at the heart of the eight workplace factors the implication is that to achieve the Output of complete employee engagement it is necessary for an organisation to attend to each of the eight Input factors. For example, there is no direct way of making employees have more pride in their organisation, but it is clearly possible to listen to them more. Thus, a survey which only measured employee engagement would be a good measure of workplace satisfaction but would not give any information on which specific areas were causing problems or on measures the organisation should take to improve. Whereas the Best Companies employee survey will measure engagement but will also present results in terms of the eight actionable input factors for which engagement is central. Many things can effect engagement, to name just a few;

Bad managers

Weak values

Failures in leadership

Job pressure

Stress

Working hours

No community involvement

The Best Companies full survey will tell you where potential problems with engagement arise and with the ability to benchmark you can clearly see areas where your organisation falls below the norm.

### **3.4 The correlational nature of the factor model**

In the factor model described in section 3.3, there are also curved lines between the factors and between some of the variables, these are there to demonstrate that there are also correlations between factors and between survey items. As has been described earlier these correlations are one of the measures used to define the quality of survey questions. Some theoretical discussion of factor models considers correlation between factors to be a weakness in that it implies that the factors are not truly independent and that to some extent two or more factors may be measuring the same thing. This criticism extends in the literature



to all models formed from factor analysis as the method itself tends to create inter-correlated models.

Because of this potential theoretical criticism it is worth taking time to consider what might be expected from any model of employee engagement. When modeling some complex mechanical processes it would be normal to expect little correlation between factors. For example, if you were to model the predicted temperature of a room you might have the factors;

- Size of the room
- Effects of central heating system
- Effects of additional electric fires
- External temperature
- Effects of open windows
- Effects of open doors
- Number of people in the room
- Etc. etc.

Within these factors are the questions you would need to ask to determine their influence. For, example effects of central heating would include, number of radiators, size of radiators, size of the boiler, etc. In this case within the final model the factors are largely independent. Thus, we would expect very low correlations between factors. We can see that the effects of the central heating do not influence the effects of electric fires which are a separate system. Their effects are merely additive on final temperature. The size of the boiler does not correlate with whether a door has been left open. In this case a model with high factor correlations would not be a good model.

Employee engagement however, is not a mechanical system. Engagement is a psychological construct which exists entirely within a company culture and the factors of company culture are closely interdependent. Thus, whether a team operates well does depend on the style of team management and good team management does depend on good senior management and leadership. Therefore, from the start any model of employee engagement will necessarily expect correlation both at the question level and between factors. For this reason we are happy to see inter correlation within the model as this reflects what we would expect from an analysis of the interdependence of the issues within company culture.



## 4 MEASURING THE PERFORMANCE OF ORGANISATIONS

So far this document has described the survey development and research base of the Best Companies methodology in terms of the statistical validity of survey questions and the factor model of employee engagement.

This section will describe those processes within the methodology which are specifically designed to make the Best Companies process an accurate measure of comparative organisation performance. That is, those things which allow us to form lists of best companies to work for, and to form a valid accreditation standard.

### 4.1 The role of the employee survey, company questionnaire and site visits

Final organisation scores for the purposes of list position are very highly based on the objective data we receive from the employee surveys. It is our intention when scoring organisations not to judge by what we think is best but rather to produce an accurate measure of what the employees think. For this reason in the great majority of cases 100% of an organisations final score is automatically generated from survey responses. This process is described in more detail below.

Where a particular issue has been identified within an organisation, for special awards, or in the case of an exact draw, Best Companies Ltd retain the right to utilise information gathered from both the company questionnaire and site visits to form up to 10% of an organisations final score. Because of a number of misinterpretations of this process in the past we would like to make it completely clear that we only score objective information and do not utilise the more subjective information. For example, we do not score, days out, champagne for staff, birthday cakes, etc. although this information is popularly reported in organisation profiles in the press. A site visit may in some cases be used to clarify company questionnaire information. Additional supporting information supplied by organisations (promotional videos, etc.) are never used in the scoring process and this fact is made clear in the company questionnaire instructions.



## 4.2 Employee survey random sampling

For data to accurately reflect the views of a whole population either the whole population must be measured, or if this is not possible the sample measured will generally be randomly selected. Random sampling has become standard practice within surveying and in the science of academic experimentation. For detailed discussion of the advantages of random sampling over other potential sampling methods, see D. De Vaus (2002) *Surveys in social research*.

As random sampling of a population is one of the assumptions on which statistical tests are based then the accuracy of statistical results depend on random sampling. For this reason the Best Companies methodology has a number of processes designed to implement and check the way in which both paper and on-line surveys are distributed within organisations.

For smaller organisations we will survey the whole organisation and so the problems of sampling biases do not arise. For medium sized and large organisations we select a proportion of employees and this selection is randomised in the following way: Firstly, all the organisations employees are listed either alphabetically or numerically (e.g. by payroll number) and then an algorithm devised by Best Companies is applied to this list to randomly select those employees who will receive a survey. The algorithm used is changed each year so that when an organisation enters in subsequent years there is no possibility of the same sample of employees being selected for any two years. Firstly the algorithm defines a number of people who must be removed from the top of the list and added to the bottom of the list. This number is always a prime number and changes each year. This first process of list reorganisation, in addition to guaranteeing that no year on year samples are the same, also ensures that those employees who may be alphabetically or numerically at the top of the list each year have an equal chance of selection in the rest of the selection process. Secondly, the proportion of employees to be sampled is calculated (See 4.3 for sample size issues) and this value is used for sequential sampling from the reorganised lists. For example, if 1 in 5 employees are required for the sample then every 5<sup>th</sup> employee will be selected from the list. There is an exception to this process for organisations who may have a large number of staff distributed widely in different regions or in different business locations (e.g. stores) who need paper surveys. Sometimes for these organisations it is impractical to post very small numbers of surveys to all of their locations and have local managers distribute these. In these cases it is necessary for the organisation to apply to Best Companies staff who will randomly select locations for surveying. In these cases a proportion of locations will be randomly selected rather than a proportion of employees. It should be made absolutely clear that if this process is agreed the organisation must disclose exact figures for staff in all locations and the selection



will always be made internally by Best Companies staff. Where an organisation may, for example, have a large head office and then many small stores, the process will randomly sample the appropriate proportion of staff from the head office using the randomisation method described above and then, in addition, the appropriate remaining proportion of staff from a randomly selected proportion of stores. An organisation requesting this method will have no choice in the selection process which utilises a computer based randomising system operated by Best Companies staff and organisations cannot appeal to change the selection once it is made.

The actual process of distributing surveys of employees is closely controlled by Best Companies. Links to on-line surveys are emailed directly by Best Companies to the randomly selected respondents and these contain the standard covering letter which explains the process and the reason for the survey. Where paper versions of the survey are necessary the process is more complex. In this case the distribution is handled by an internal project manager nominated by the organisation who will be in close contact with Best Companies staff. The project manager will receive the surveys, pre-paid envelopes for employees to mail surveys returns directly. Copies of the standard covering letter and instructions for distribution are delivered via the Best Companies website which guides all project managers through the whole process. Best Companies make it very clear that the rules only allow changes to the standard covering letter if these changes have been submitted to, and agreed by, Best Companies in advance and that no other material should be distributed along with the survey. The accurate distribution of surveys according to these agreed methods is to a certain extent an area of trust between Best Companies and participating organisations, however, there are a number of outcome checks for this process. As surveys are returned their demographics are automatically matched against the organisation demographics (recorded in the company questionnaire), this automated system flags significant discrepancies in distribution pattern to Best Companies staff. This system also has the added advantage that we can be assured that when reporting data back to organisations we have a representative sample of employee responses and thus the data does not suffer from selection biases. In cases where questions have arisen over survey distribution Best Companies reserve the right to follow these up in site visits.

### **4.3 How many employees to survey**

The accuracy of data to reflect a whole population (organisation) depends to a large extent on the number of people sampled from the population. However, it is a popular misconception



that accuracy depends on the proportion (or percentage) of people sampled. This is why it is a perfectly acceptable and normal standard for surveys of the whole UK population of roughly 60 million people (for example, product preference surveys) to use samples of 1000 people. As can be seen from the table below a sample of this size will give a roughly 97% accuracy when reflecting the views of the whole population, no matter the size of the population. Of course this accuracy rate will only be true if care has been taken to ensure true random sampling (See section 4.2). For those interested in detailed analysis of the power of samples to represent the underlying population we recommend J. Cohen (1997) *Statistical power analysis for the behavioural sciences*.

The table below is adapted from D. De Vaus (2002) *Surveys in social research 5<sup>th</sup> edition* which clarifies the fact that the choice of sample size is not dependant on the number of people in a population (in this case an organisation) but depends on two things only;

1. The degree of accuracy required
2. The extent to which there is a variation on the population

The table shows the sampling error of different sample sizes for measurements on which the sample population has a roughly 50/50 split. These figures allow us to calculate the percentage accuracy of a survey sample to truly represent the population from which it is sampled.



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Table of statistical accuracy of samples to reflect whole population

<b>Number of people surveyed</b>	<b>Sampling error (2 standard errors)</b>	<b>Statistical accuracy to reflect the whole population</b>
10000	1.0%	99.0%
4500	1.5%	98.5%
2500	2.0%	98.0%
1600	2.5%	97.5%
1100	3.0%	97.0%
816	3.5%	96.5%
625	4.0%	96.0%
495	4.5%	95.5%
400	5.0%	95.0%
330	5.5%	94.5%
277	6.0%	94.0%
237	6.5%	93.5%
204	7.0%	93.0%
178	7.5%	92.5%
156	8.0%	92.0%
138	8.5%	91.5%
123	9.0%	91.0%
110	9.5%	90.5%
100	10.0%	90.0%

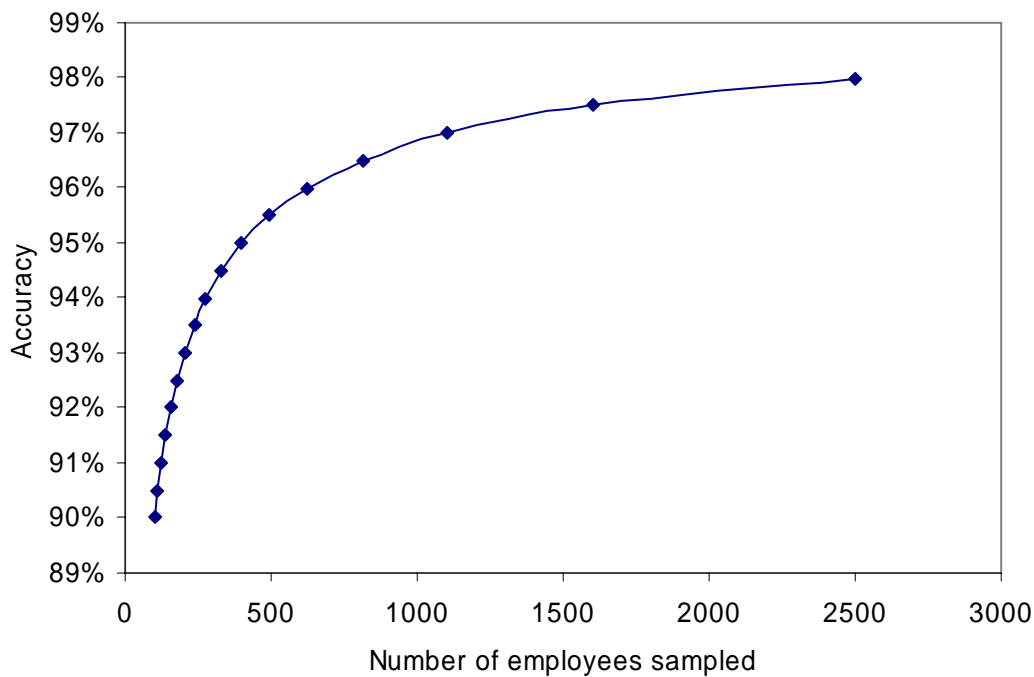
It is worth noting that for smaller samples even a small increase in the number of people sampled will result in much greater accuracy. For example, for a sample of 100 people just adding another ten will reduce the potential error by 0.5%. At the higher end of the scale there is a law of diminishing returns, to move from 98.5% accuracy to 99% requires an additional 5,500 people.



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This relationship can be seen more clearly in the graph below.

### Percentage Accuracy of Survey Samples to Reflect a Whole Population



Appropriate random sampling for organisations is closely monitored by Best Companies, not only for statistical accuracy but also for special cases in staff distributions where normal procedures may produce biased samples (See section 4.2). Because of the issues of accuracy of sampling for smaller organisations we have a minimum limit of 50 employees for organisations entering the competition. For smaller organisations where selecting a random sample might cause accuracy issues we survey the whole organisation. Minimum surveying limits for competition entry are set out in the table below.

For any company the total number of surveys sent out is the sum of the number in each band. Thus, if a company is in band C they would receive surveys equal to, 25% of their band C employees plus 50% of their band B employees plus 100% of their band A employees.

Organisations may also choose to survey more than the minimum requirement.

Band	Min Employees	Max Employees	Percentage Of Employees	Number Of Surveys
A	50	249	100	
B	250	2499	50	



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C	2500	4999	25	
D	5000	(number of employees)	10	

For example, if a company has 5028 employees we work through the table in reverse order using the following formula;

$$\text{SUM}(\text{ROUND}((\text{Max Employees} - \text{Min Employees} + 1) * \text{Percent of Employees}, 0))$$

The results of this example are displayed below:

Calculation	Surveys
Band D: $\text{ROUND}(10\% * (5028 - 5000 + 1), 0)$	3
Band C: $\text{ROUND}(25\% * (4999 - 2500 + 1), 0)$	625
Band B: $\text{ROUND}(50\% * (2499 - 250 + 1), 0)$	1125
Band A: $\text{ROUND}(100\% * (249 - 1 + 1), 0)$	249
<b>Total</b>	2002

The calculated figure for the number of surveys a company should get is only a minimum figure, if an organisation requests more surveys then these will be distributed.

The number of surveys for the Best Councils Project is calculated in the same way.

#### 4.4 Necessary response rates

The response rates necessary to complete both Best Companies Accreditation and the Sunday Times competition entry are as follows;

List Size	Return Rate
Small Companies	40% or 30 surveys whichever is greater
Mid-sized Companies	40%
Big Companies	30%

An organisation failing to achieve the percentage return rate for the number of surveys required will not go forward in the process. Best Companies Ltd will do everything possible to include organisations fairly, however, our decision in this area is final and we will not enter into discussion on this decision.



## 4.5 Cheating checks

There are a number of checks instituted in the Best Companies methodology to prevent or identify cheating. Clearly it is only in the interest of those who might want to cheat to publish the details of all the cheating checks. However, it is possible to roughly outline some of these checks.

We actively request employees of organisations entering to contact us if they have any concerns about the way the surveying process has been handled. In addition the survey contains a checkbox where employees are asked to confirm "I have been able to complete and send this survey confidentially without any pressure or inducement to answer positively". All concerns are handled anonymously and all concerns are investigated.

The use of positive and negative questions in the survey makes erroneous completion of multiple surveys with top scores a very time consuming and difficult process, this leads to specific data patterns which can normally be identified by pattern matching programs. This is an added advantage to the avoidance of bias from surveys with all positive questions outlined above. Security numbers on surveys, whilst not identifying individuals, allow us to track the progress of surveys sent to particular organisations. In addition on-line surveys are individually password protected to prevent access by anyone except the recipient.

Both computer based and manual data pattern matching processes are used to flag abnormal patterns within the data. Automated demographic matching processes will flag unusual (or even impossible) mismatches between organisation demographics and returned surveys.

Best Companies reserves the right to use site visits to check the details of any issues which may have arisen in the checking process. The great majority of organisations recognise the value of good accurate data over attempting to bias responses to gain a higher list position. However, there are always exceptions and it has unfortunately been necessary to reject organisations for cheating or misrepresentation from the process in the past. Because of the nature of the cheating checks it has always been possible so far to reject organisations before the list has been calculated. However, if a case were to arise after list publication Best Companies would not hesitate to remove the organisation with all the attendant negative publicity for that organisation.



## 4.6 Anonymity

True anonymity of survey responses is crucial to collecting accurate data. There is a wealth of academic research showing that any possibility (real or imagined) of individual data not being anonymous will seriously bias peoples responses. See Sudman and Bradburn (1974) *Response Effects in Surveys*. Anonymity is different from confidentiality and Ong and Weiss (2000) *The impact of anonymity on responses to "sensitive" questions*, present a compelling description of the differences in true anonymity and guarantees of confidentiality in survey responses. They show that promises of confidentiality are not trusted and have a serious effect on the quality of data collected. Thus, it is extremely difficult for any in-house survey to convince employees that their responses will be truly anonymous.

Best Companies takes respondents anonymity very seriously and will never ask employees to put their names on surveys or to include any personally identifying data. In addition, we will not report back to organisations information based on demographic splits which contain the responses of less than six employees. It is only as a trusted third party that we can guarantee anonymity and avoid bias in our survey results.

For on-line surveying, the survey itself is not emailed. Employees are emailed directly from Best Companies with a code to log on to our server. If they then choose to complete and submit the survey this process is completed entirely on our server and not through email. (Note: Employees may complete their survey from any computer) The survey does not ask for an employee's name. The code used to log on to our server will only identify which organisation an employee belongs to.

For paper surveys, blank surveys are sent to an internal project manager who then distributes them to a pre-selected sample of employees. Each survey is distributed with a stamped addressed return envelope. It is then the employees responsibility to send the completed survey directly to Best Companies. Thus, the project manager will only ever handle blank surveys. Completed paper surveys do not contain names. In addition, the paper surveys each contain a code allowing any recipient to complete the survey on-line if they prefer. (Once completed on-line the paper survey will automatically be cancelled, duplication of responses is not possible)



## 5 SCORING THE SURVEY

### 5.1 Scoring questions

Although the items in the survey are generally referred to as “questions” they are in fact a series of statements, for example, “This is my dream job” and respondents answer them by selecting from an Agree/ Disagree response scale. The Best Companies survey uses a 7 point response scale;

Strongly agree

Agree

Slightly agree

Neither agree nor disagree

Slightly disagree

Disagree

Strongly disagree

Positively worded questions, for example, “My workload is fair” are scored from 1 for “Strongly Disagree” through to a score of 7 for “Strongly Agree. Negatively worded questions, for example, “I am bored with the work I do” are scored in exactly the opposite way, from a score of 1 for “Strongly Agree” through to a score of 7 for “Strongly Disagree. Thus, all questions are scored on a 1 to 7 scale where a higher score always reflects a positive viewpoint and a lower score represents a negative viewpoint.

### 5.2 Factor scores

Factor scores are created by taking the average (mean) of the questions in a factor. Some of the factors have more questions in them than others. The questions that are assigned to a factor are a research finding from the exploratory and confirmatory factor analysis which we perform to determine our workplace model. (See Section 3.2) As described earlier, the factors and the questions which go to make them up, are not chosen by Best Companies or by any other form of “expert”, because any sort of judging process would put a subjective bias into the data scoring.

We use the factor analysis methodology because the analysis determines the factors that employees filling in the surveys regard as most important to their engagement. This research also determines that the questions in a factor are the most objective and statistically valid ways of measuring that factor. It should be remembered that a factor is a psychological



concept and some concepts have a more complex make up than others. For example, the factor analysis finds that employees' views on Leadership are complex. They include views on the leader as a person, the senior management team and the values/principles of the organisation. The analysis also determines exactly what questions best measure each of these sub-groups. Because of this factor complexity the analysis determines that for an accurate overall view of Leadership a large number of questions are required. At the other end of the scale the analysis shows that the Fair Deal factor which measures employees' views on pay and benefits is a relatively simple psychological construct. Here employees have very clear views which can be accurately determined with few questions. The research has found that when new questions are added to this factor in test analyses then they correlate extremely highly with existing questions. This means that they add no new information to the model and thus cannot validly be used. For detailed statistical reliability results for the factors see Appendix 2.

The fact that there are necessarily different numbers of questions in different factors means that the amount of influence an individual question has on the final score is not obvious. Each question in a factor which has a larger number of questions will necessarily have less influence on final score than each question in a factor with few questions. This is normal in measuring psychological constructs. For example, we would consider a much wider range of issues when judging the qualities of people than when judging the qualities of a pay packet. In fact a survey with exactly equal questions in each factor would be biased away from the psychological truth. Best Companies methodology does not seek to control the factors or their make up and as such the methodology does not adjust or weight the objective analysis results. Not all questions in the survey are scored as factor questions to create list position. Only those determined by the factor model are used. As described in Section 2.6 (Year on year survey development) some questions in the survey are test questions for possible inclusion in the following year and some are check questions which are used internally by us. We do not release details of these questions unless they have been fully tested and accepted and become a useful part of the factor model of workplace engagement. There are also feedback questions, these are not part of the factor model or the scoring process but provide useful additional information.



### 5.3 Factor weighting in scoring the survey

As described above factor scores are the average (mean) scores of the questions in a factor. To create a final overall score these factor scores are averaged. However, because the factor scores have different overall standard deviations (greater variance in scores across different organisations) we weight the factors based on their standard deviations to ensure that each one has an exactly equal influence on the final score for an organisation. This is a process called “normalisation” or “standardisation” and is standard practice in the statistical amalgamation of measures of different concepts or on different scales. See Torgenson, W. S. (1958). *Theory and Methods of Scaling*.

If we did not use this weighting then the factors with higher standard deviations would have more influence on the overall rankings. So this methodology can be described as a weighting for equality (to prevent imbalance). The final result of this weighting is that no factor is any more or less important to the final overall score than any other factor.

### 5.4 Are different industry sectors measured differently?

The Best Companies methodology treats all industry sectors in the same way. The employee survey measures workplace engagement and final survey scores are based on this measure without weighting. As such this is a pure measure and when an organisation does well on one of our lists we can say definitively that their employees are engaged regardless of the type of organisation they belong to. This is in fact all we claim for our results, that in high ranking organisations employees are more engaged, and we know this because they have told us. We do not claim, for example, that we have analysed an organisation and guarantee all the practices of that organisation are good or make any other organisation related claims.

If we weighted sectors differently then we would have to find some sort of objective evidence on which to base sector weightings to prevent claims from different sectors each arguing that they had a special case. The other problem with this approach would be classifying organisations to sectors, there are many which are in a class of their own or are a mixture of 2 or 3 different sectors. Best Companies are, however, clearly aware of the importance to organisations of being able to utilise sector benchmarks for comparison and improvement. For those organisations who want to make this comparison a choice of benchmarks (both sector and list based) is available in the Workplace Insight Tool (WIT) results feedback.

A number of people have raised the issue that it might be easier for Charities to enter the lists, particularly as Giving Something Back is one of the factors. We have specifically analysed the performance of charities with this in mind. The results show that although Charities do generally score better than other sectors in Giving Something Back, this advantage is exactly



balanced by lower scores in other factors. The overall analysis shows no statistical difference in the proportion of Charities who are successfully listed compared to the proportion of other organisations who are successfully listed. (In Mid size and SME entries for 2008 - 6.5% of all entries were charities, 4.5% of listed companies were charities).

## **5.5 Organisation size differences**

The Best Companies methodology described here has been extensively tested on organisations of all sizes above our minimum of 50 employees. We have run separate exploratory factor analyses on groups of organisations of different sizes to explore the possibility that organisations of different sizes may operate on different kinds of workplace engagement models. The results of these have always produced the same eight factor model described above with factors of equal strength and importance to the original model. Because of the findings of this research we are confident that the model applies to all sizes of organisation. The factors which are important to employee engagement in SMEs are the same factors which are important to employee engagement in large organisations.

We do recognise, however, that whilst the model is statistically valid across all sizes, there are different challenges facing organisations of different sizes. For example, in an organisation of 50 people it is possible for the leader to personally greet every employee every day, whereas this would be impossible in an organisation of 100,000 people. Also a strategy you might put in place in a large organisation, for example, provision of a gym on site to improve Wellbeing might be completely inappropriate for a smaller organisation. Because of the difference in challenges, and in strategies of change, we produce separate lists for Big, Mid Size and SMEs. This choice of three lists is not made necessary by the methodology which could be used to produce a single list but is rather driven by the recognition that these three groups will be interested in different strategies for improving engagement.



## 6 ACCREDITATION METHODOLOGY

The Best Companies three star accreditation system is founded on the factor model of workplace engagement developed and validated in the last five years as described above. However, the accreditation has a different purpose to that of list calculation and therefore there are differences in the way the methodology is applied.

The purpose of accreditation methodology is to produce a set of absolute standards for organisations which reflect their achievements in employee engagement. Based on a single Best Companies Index Score, these standards must be absolute and not change over time, additionally they must apply equally to organisations of all sizes. The accreditation methodology described below is designed to meet these imperatives.

### 6.1 Accreditation surveying

When originally developed the Accreditation index score was calculated using a sub-set of 16 key questions from the survey which had been fixed and would not change each year. Since that time we have repeated our yearly factor analysis of the survey questions and have now analysed results from over 700,000 UK employees. We have had excellent results in the last 2 years (See Appendix 1 for factor model statistics) from our 54 scoring survey questions and in fact we have not found it possible to improve on this model so there have been no changes to these questions. Given these excellent results we no longer need to use a fixed sub-set of questions and so we have decided to base future accreditation scores on the full 54 scoring questions from the survey. This is a very positive development for accreditation scoring and will make the process less complicated for organisations entering.

### 6.2 Accreditation scoring for organisations of different sizes

For the calculation of the Best Companies Accreditation index score the overall scores for each organisation are normalised in order to put large, mid sized organisations and SMEs on the same scale.

The process of "normalisation" or "standardisation" is a standard practice in the statistical amalgamation of measures of different concepts or on different scales. See Torgenson, W. S. (1958). *Theory and Methods of Scaling*. In this case it involves converting organisation scores for the three different size groups to Z scores by applying the following formula;

$$Z = \frac{X - M}{SD}$$

Where the **Z** score equals **X** (an organisations "Raw" score), minus **M** (the Mean or Average of all scores for organisations in that size group), divided by **SD** (the Standard Deviation of all



## Best Companies

scores for organisations in that size group). This standard method places organisations of all sizes on exactly the same scale producing a single equalised distribution of organisational performance.

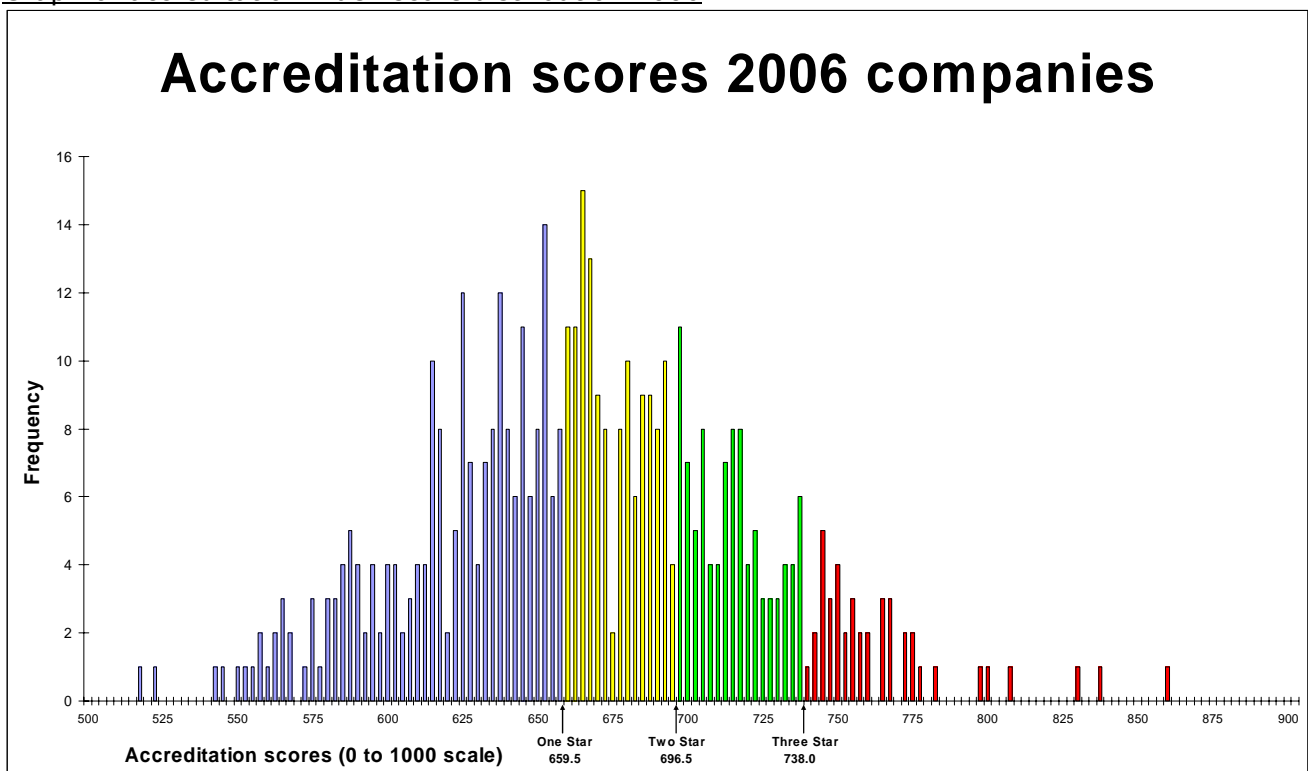
The resulting Z scores are then converted to a scale approximating to 0 to 1000 to produce the accreditation index scores. It is this scale which is used to measure accreditation and set accreditation standards as described in the next section.



## 6.3 Setting accreditation standards

The graph below shows the distribution of scores for the Best Companies Accreditation index for all organisations completing the survey process in 2006 (the year the accreditation standard was set). The difference between organisations attaining one, two or three stars can be seen clearly on the graph. Bearing in mind that all organisations on this graph are selected from the best in the UK, the three star organisations (in red) can be seen to have produced an extraordinary performance in employee engagement when compared to the normal distribution. The two star organisations (in green) have produced a performance which is outstanding and the one star organisations (in yellow) are consistently doing all the right things to keep their employees engaged.

Graph of accreditation index score distribution 2006



Now that these high standards have been set they will remain fixed as a target of attainment for all UK organisations. The accreditation cut-off scores are;

Above 659.5 – One Star

Above 696.5 – Two Star

Above 738.0 – Three Star



## **6.4 Differences between the accreditation standards and the list methodology**

For some organisations it has been a source of frustration that they can obtain the same or a improved score compared to a previous year and yet move down places on the Top 100 list. This is in the nature of a competition where each year some of the new entrants will come in at high places on the list moving everyone else down.

The full survey used for the list measures a wide range of concepts within the eight workplace engagement factors and is sensitive to changing workplace issues over time, so for any given year there will be slight changes in list scoring reflecting the importance of current issues. The methodology for the Best Companies Accreditation has been designed for a different purpose; specifically to use an unchanging measure to set unchanging standards. In the case of the accreditation an organisation which maintains their engagement score will always maintain their accreditation. The accreditation is not a competition, rather the standards are a cause for celebration for all the organisations who achieve the standard, how ever many that may be. We hope that this methodology will encourage more and more organisations in the future to put the effort into achieving and celebrating high standards of workplace engagement.

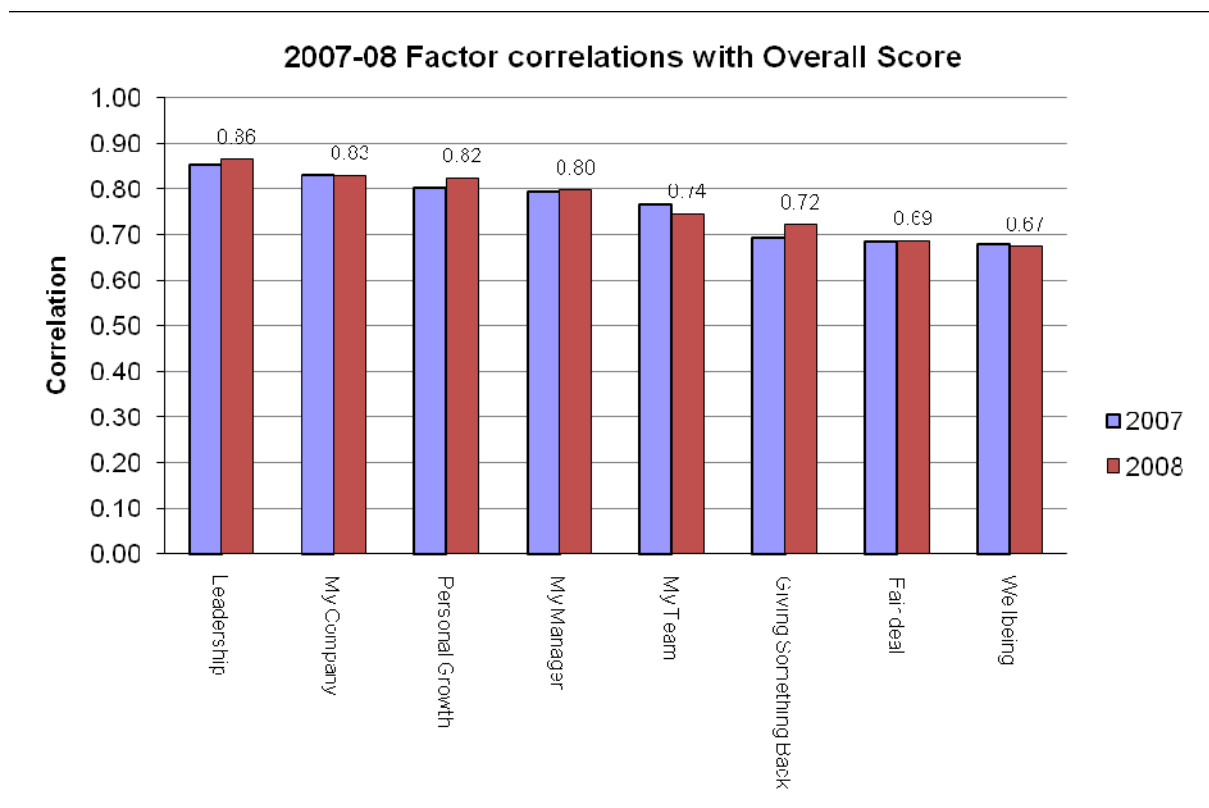


## 7 THE WORKPLACE INSIGHT TOOL (WIT)

### 7.1 Introduction – The importance of analysing you data

The primary purpose of Best Companies Ltd. is “To help make the world a better workplace” and whilst there are clearly benefits of publicising best practice in Accreditation and Top organisation lists, it is the analysis of organisation’s data from the surveying process which allows for targeted change to improve employee engagement. We have created the on-line Workplace Insight Tool (WIT) to enable organisations, firstly to easily understand and benchmark factor results and secondly, to drill down into a wealth of detailed engagement information.

At Best Companies the question we are most commonly asked is “Which factor is the most important?” and I will outline here our approach to this question. As part of our employee engagement model we do produce correlations of the factors with employee engagement, the correlations are as follows:





You can see from the graph that the correlation results are consistent year on year and appear to show that leadership is the most important factor (and wellbeing the least). However, there is a problem with this view, the relationship between the factors and employee engagement is non-linear. The non-linear relationship makes the correlational analysis unreliable and as linearity is necessary for regression it will also make regression results unreliable. It is of course possible to perform non-linear regression however I will explain below why this is not the best approach to answering the question “Which factor is the most important”.

Firstly, why is the relationship between the factors and overall employee engagement non-linear? Let’s take Wellbeing (apparently the least important factor) as an example; where Wellbeing scores are generally good, let’s say 90% of the maximum possible score, the great majority of employees have few or no wellbeing issues. If we then reduce the wellbeing scores by 20% (to 70%) there will be little impact on the other factors and little impact on employee engagement because although employees are under a little more pressure 70% is still a pretty good score and the great majority of people can cope with the pressure at this level. So here a 20% drop in Wellbeing scores has had little effect. However, if we take an organisation where the Wellbeing score is 40% and then reduce that by 20% the effect will be catastrophic. Employees will burnout and will leave (usually better employees leave first), leadership, management and team working under this level of pressure and stress will all fail to operate well and the knock on effects will be devastating. So although both these scenarios relate to a 20% drop in Wellbeing the effects on overall employee engagement are totally different.

We generally explain this non-linear relationship using a formula one racing car analogy. Leadership is made up of three sub-factors, the leader, senior management and organisational values. In our analogy, the leader is the driver of the car, senior management are represented by the control systems (brakes, accelerator, clutch etc.), and the values are represented as the steering. The My Company factor (My Council for council data) is represented by the engine (a measure of driving force), My Manager is represented by gearbox drive shafts, etc (directing the power where it needs to be), My Team is represented by various systems wheels, tyres, etc. (as different teams do different jobs), Wellbeing as aerodynamics, and so on for the other factors. In this analogy we can see the leader is very important and, as long as all the other systems are working can drive the car fast and well (lap times being the overall employee engagement result). However, if there is a serious failure in any of the other systems; one team operating as a flat tyre or a wellbeing effect similar to towing a parachute, this effects all the other systems and the leader no longer has full control.

Whilst this is a relatively simple analogy it does describe the non-linear relationship between factors and final employee engagement well. When everything is working reasonably well



## Best Companies

Leadership is the most important factor, however, any factor which is seriously below benchmark will start to have an increasing effect on the overall picture and then that factor becomes the most important.

Given this relationship the question "Which factor is most important?" needs to be rephrased as "Which factor is most important *to your organisation?*" and the only way to answer this question is for each individual organisation to look at their own data compared to benchmarks. The crucial importance of an organisation looking at their own data rather than relying on overall analysis or general advice has been highlighted in a new analysis we have completed this year (2008). We tested the approach of individual recommendations from the data on 675 companies entering our process this year. We set two criteria for whether a factor would be recommended as needing attention, firstly that the factor score was below best practice benchmark (for best practice benchmark we took the average score of 3 star accredited companies), secondly that the factor score (normalised) was below average for that company. Only when both criteria were met was a factor flagged as "needing attention". A selection of the results for organisations is presented in the table below where a red mark indicates "factor needing attention".



# Best Companies

Selection from table of factors needing attention for companies

	Leadership	My company	Personal Growth	My Manager	My Team	Giving Something Back	Fair Deal	Well Being
Organisation 1	0	0	0	0	0	1	0	1
Organisation 2	0	1	0	1	1	0	0	1
Organisation 3	0	1	0	1	1	0	1	1
Organisation 4	0	0	0	1	0	0	1	1
Organisation 5	0	0	0	0	0	1	1	1
Organisation 6	1	1	1	1	1	0	0	0
Organisation 7	0	0	0	0	0	1	1	1
Organisation 8	1	1	1	0	0	0	1	0
Organisation 9	0	1	0	1	1	1	0	1
Organisation 10	1	0	0	1	1	0	0	1
Organisation 11	1	0	1	0	0	1	1	0
Organisation 12	0	0	1	0	0	1	1	1
Organisation 13	1	1	1	0	0	0	0	0
Organisation 14	1	1	1	1	0	0	1	0
Organisation 15	1	1	0	0	0	1	0	1
Organisation 16	0	0	0	0	0	1	1	1
Organisation 17	0	0	0	1	1	1	0	1
Organisation 18	1	0	0	0	0	1	0	1
Organisation 19	1	0	0	1	1	0	1	0
Organisation 20	0	0	0	0	0	1	0	1
Organisation 21	1	1	0	0	0	0	1	1
Organisation 22	1	0	0	1	0	0	0	1
Organisation 23	0	0	0	1	1	1	1	0
Organisation 24	1	1	1	0	0	0	1	0
Organisation 25	1	0	1	1	0	0	1	0
Organisation 26	1	0	0	1	0	1	0	1
Organisation 27	0	0	0	0	0	1	0	1
Organisation 28	1	0	1	0	1	1	0	1
Organisation 29	0	1	1	0	0	0	1	1
Organisation 30	1	0	0	0	0	1	1	1



The surprising result, which can be seen in the extract, is that there is no overall pattern in the analysis results; in fact we identified 181 different individual patterns of factors needing attention in the data. Thus, there are very few organisations for whom the most important factor or factors are the same.

This result means that if you were to give organisations general advice that, for example, Leadership is the most important factor this would be true for around 50% of the companies in our selection (below) but would be misleading for the other 50% who would be better off focusing on other factors. Thus, the only sensible advice for organisations is to compare their own data to best practice benchmarks and see what are the most important factors *for them*. We recognise the importance for organisations to be able to identify the most important development factors for themselves and to this end we have introduced this year (2008) the addition of a "stretch" benchmark in WIT for the overall factor graph. (See examples in section 7.2) This graph enabling an organisation to benchmark their overall scores against the next highest scoring category of organisations is free for all companies entering either Accreditation of the Sunday Times list process.

## 7.2 Some examples of data analysis using WIT

The opening page of the Workplace Insight Tool (WIT) contains an executive summary of your organisations results. In the "Charts" section, under the "Overall" tab is your organisations overall factor score graph with benchmarks. (Note. Sunday Times list benchmarks only become available after publication of the list).

In Example 1 (shown below) the overall factor scores for the organisation are shown in the blue columns, in the grey columns are the "stretch" benchmark for that organisation. The percentage difference boxes clearly show where the organisation differs from the benchmark. This graphical format allows us to identify without difficulty that for this organisation the most important factor holding back employee engagement is Wellbeing (22% below benchmark). Secondly, for this organisation there is clearly also an issue with Fair Deal (10% below benchmark).

## Example 1 – Overall factor graph Organisation A



Example 2 shows the overall factor graph for a different organisation. Here, we see a completely different pattern of results from the organisation in the first example. We can identify that for this organisation the most important factor holding back employee engagement is Giving Something Back (25% below benchmark). Followed by Personal Growth (16% below benchmark).

## Example 2 – Overall factor graph Organisation B





# Best Companies

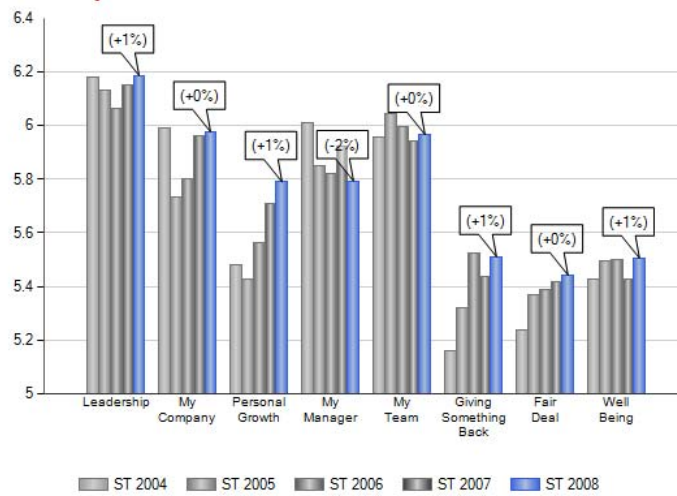
Year on year data is also available for those organisations who have been in the process in previous years. This data can be very useful in measuring the effects of organisational changes and the success of interventions.



## The Workplace Engagement Specialists

- Executive Summary
- Accreditation Score
- Charts
  - Overall
  - Leadership
  - My Company
  - Personal Growth
  - My Manager
  - My Team
  - Giving Something Back
  - Fair Deal
  - Well Being
- Comments
- Response Rates
- Upgrade
- User Guide
- Back Office
- Return To Website
- Help

### Overall by Factor



Survey: Sunday Times List 2008

Compare to:

Benchmark

3 Star Mid Companies

Survey Entry

Sunday Times List 2007

Sunday Times List 2006

Sunday Times List 2005

Sunday Times List 2004

None

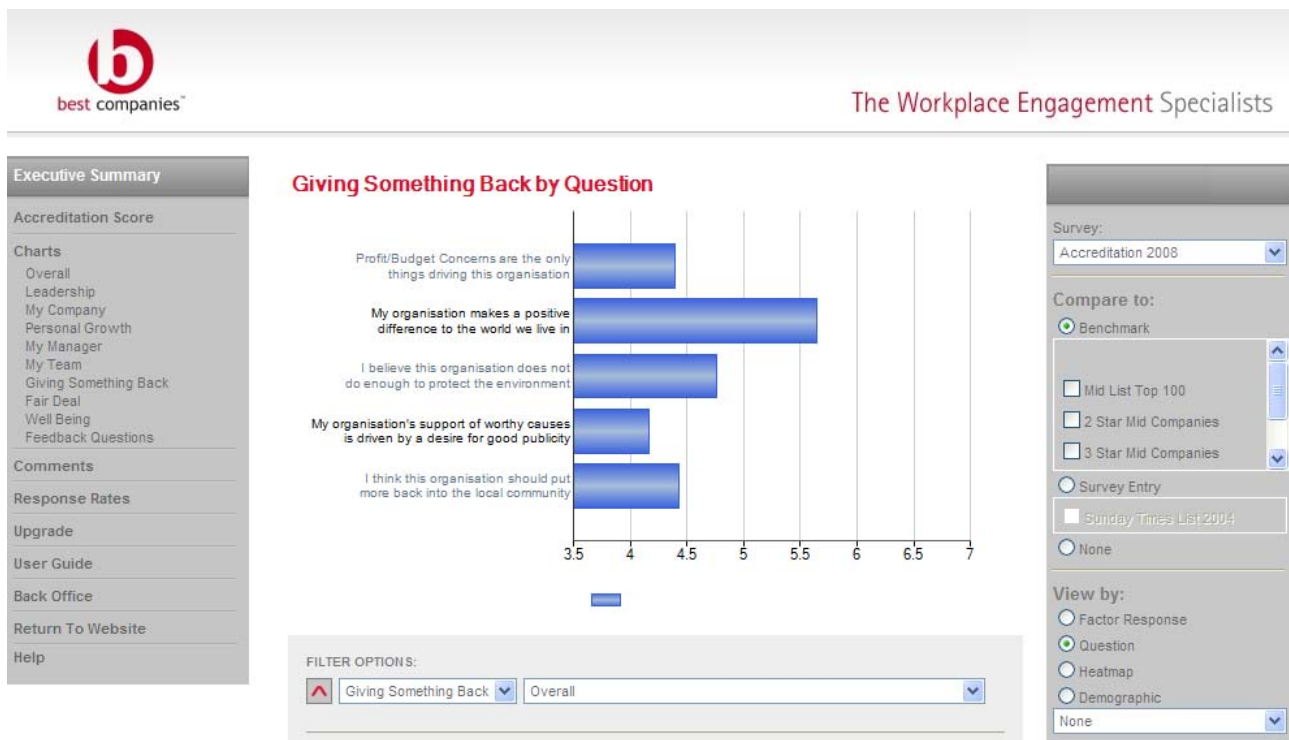
View by:

Factor

Demographics: None

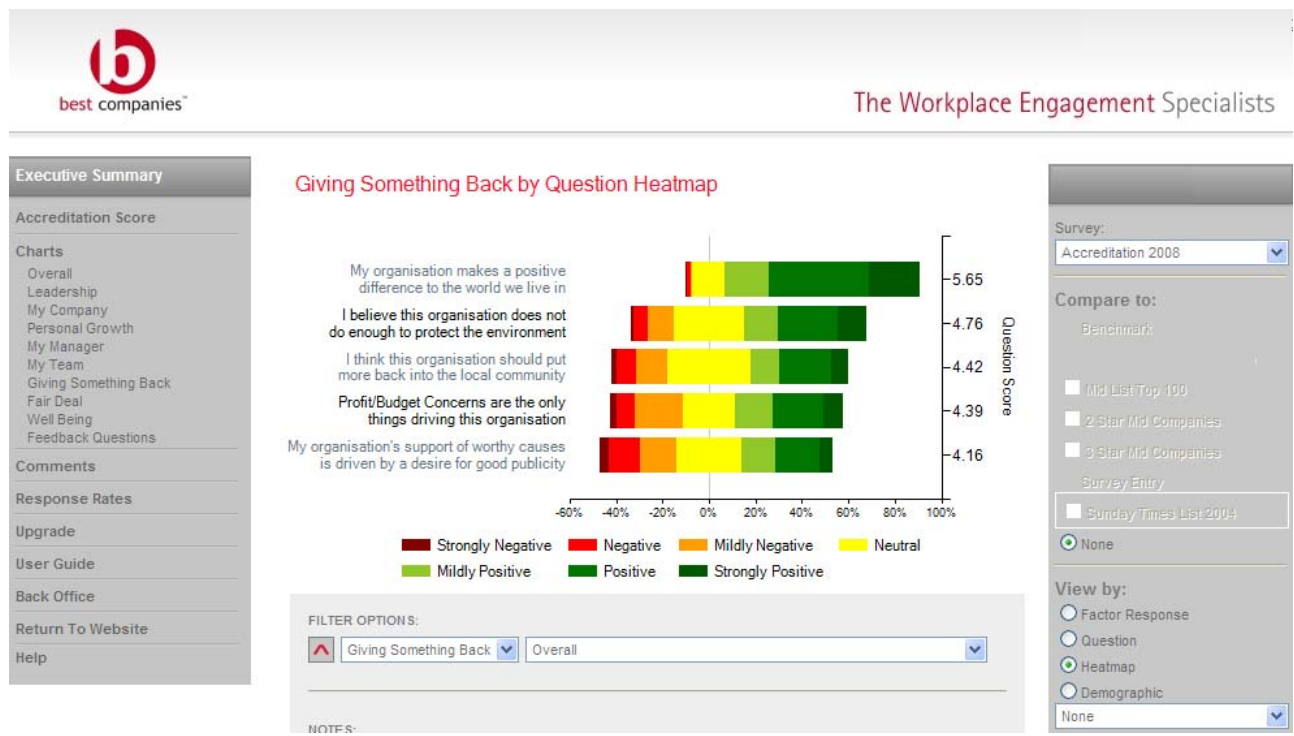
Having Identified a factor on which to concentrate then there is a wealth of detailed information on the precise data from that factor available in WIT. Some examples are shown below.

The detail of the issues within the factor can be seen in the question scores chart for the factor. It is often very useful to benchmark these individual question scores. In the example below we can see that although employees generally believe that their organisation makes a positive difference to the world we live in they are less sure that this positive difference is not driven by a desire for good publicity.





The percentages of employees responding in particular ways to question issues can be seen in two formats; heat-maps and factor responses for individual questions. Both these data charts enable you to see the proportions of employees responding in particular ways. This is useful information because it is often easier to increase the engagement of those employees in the neutral (don't know) category who have not made their mind up on an issue. A large proportion of "don't knows" generally indicates communication failures.





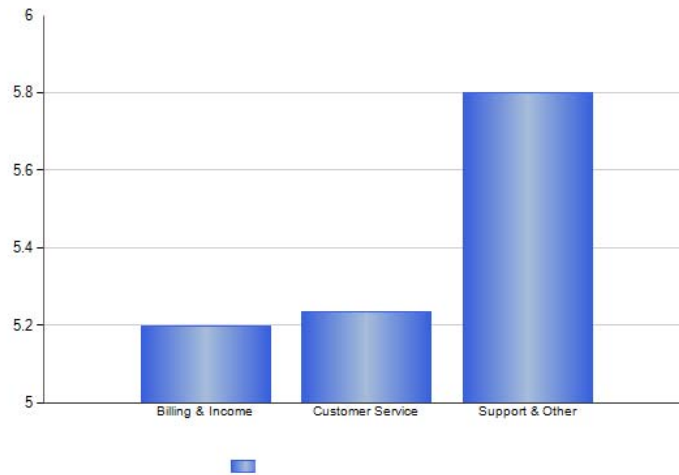
The demographic patterns in the data also give particularly useful information for targeting change. In the example below the employment group *“support and other employees”* have good levels of belief that their job is good for their own personal growth. These scores are not matched by either of the other two employment groups. In this case changes to improve personal growth would be best targeted on the employment groups *“customer service”* and *“billing and income”*.



## The Workplace Engagement Specialists

- Executive Summary
- Accreditation Score
- Charts
  - Overall
  - Leadership
  - My Company
  - Personal Growth
  - My Manager
  - My Team
  - Giving Something Back
  - Fair Deal
  - Well Being
  - Feedback Questions
- Comments
- Response Rates
- Upgrade
- User Guide
- Back Office
- Return To Website
- Help

### This job is good for my own personal growth by Employment Groups



FILTER OPTIONS:

Personal Growth
  This job is good for my own personal growth

Survey: Sunday Times List 2008

Compare to:

Benchmark

No Benchmarks

Survey Entry

Sunday Times List 2007  
 Sunday Times List 2006  
 Sunday Times List 2005  
 Sunday Times List 2004  
 Sunday Times List 2003

None

View by:

Factor Response

Demographic

Employment Groups

Overall

Filter by:

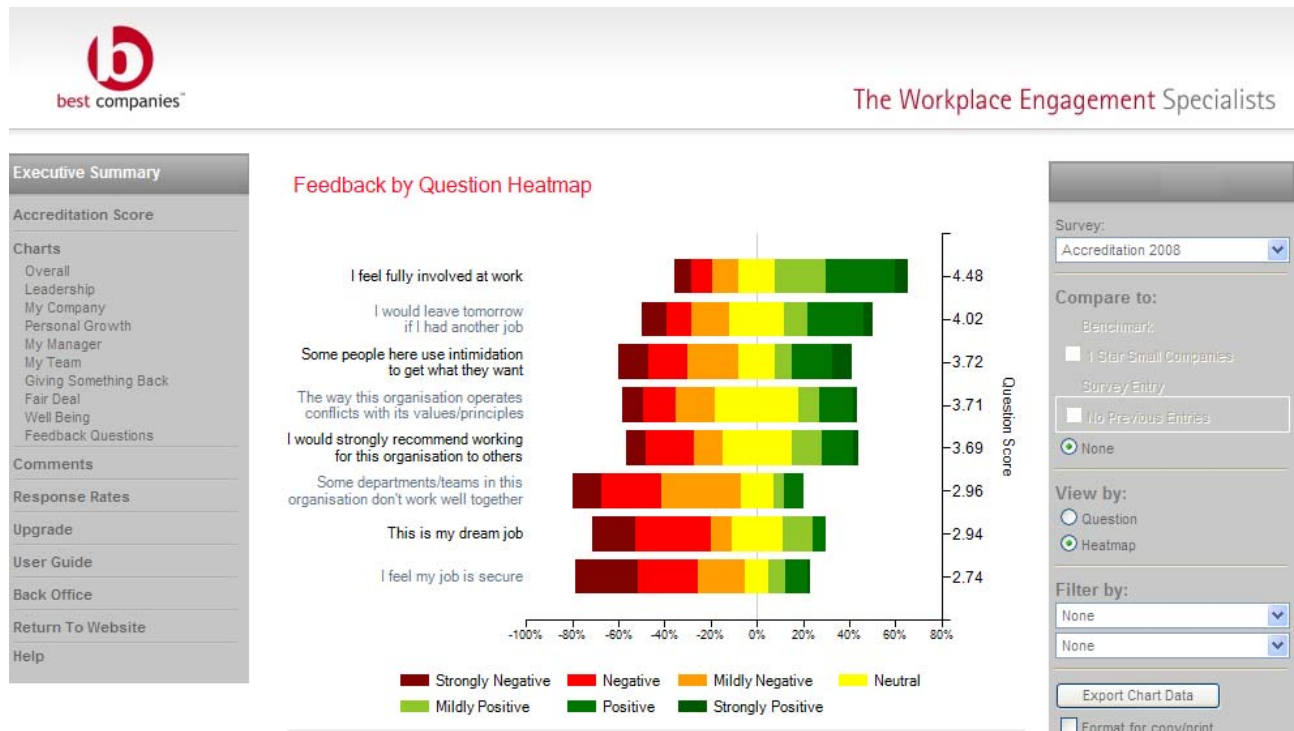
None



# Best Companies

Feedback questions are specifically designed to give organisations information on other employee issues related to engagement results. For example, the proportion of staff who might be thinking of leaving (as seen in the response patterns to the question “I would leave tomorrow if I had another job”) will highlight retention issues.

In the example below there is clearly an issue with departments not working well together as less than 20% of employees have a positive response to this question. There is also an issue with staff not believing their jobs are secure.



For further information, the WIT guide pages on the website will show you how to navigate through your results in greater detail. You can also book a WIT demonstration with the Best Companies team who will guide you through your data on-line. Detailed expert analysis and advice on targeting change is available from Best Companies Partnership LLP.



## 8. FUTURE DIRECTIONS

The Best Companies research base is constantly growing and developing. We have a commitment "To help make the world a better workplace" and as part of this commitment we are constantly looking for better levels of feedback for organisations.

Through our dialogue with participating organisations we recognise that accurate and timely feedback of information is crucial for organisations to target improvements in their workplace. In the past participant noted that there was a long time period between surveying (September to November) and release of data for those organisations on the list (list publication – March). For this reason we have now introduced early release of data back to organisations. Although this data will not include specific rankings which would compromise the Sunday Times lists it will allow organisations to analyse their own results at an early stage.

Our move to increasing on-line surveying from 2005 to the present day has also allowed us to make some test developments in interactive surveying. We have tested a process which selects Managers/Supervisors and Senior Managers of companies and presents an additional optional survey on management practices. It should be noted that these extra questions are only introduced in the on-line process after the normal employee survey has been completed and submitted so as not to influence the standard survey results. It is not currently our intention to use this information for any form of listing or accreditation assessment, rather just as an increased level of feedback which we hope participating organisations will find useful.

In the current year (2007-08) we have introduced a new measure of Brand Engagement based on a set of questions designed to elicit employees engagement with the brand of their organisation. For those organisations who are interested in this area we hope in the future to research the links between employee brand engagement and customer engagement with brand.



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## Appendix 1 - Statistical validity of the 8 factor model

### Goodness of fit of the overall 8 factor model

These results are from the 2008 factor analysis (189,714 employee responses). Analysis was performed using Mplus software (Version 4.21, copyright Muthen & Muthen 2007).

#### TESTS OF MODEL FIT

##### CFI/TLI

CFI	(Comparative fit index)	0.993
TLI	(Tucker-Lewis Index)	0.991

##### RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.049
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Values of CFI, TLI vary from 0 to 1.00, values above 0.90 suggest adequate fits, those greater than 0.95 indicate good fits (Diamantopoulos Siguaw 1999; Hulland, Chow and Lam 1996; Kaplan 2000). Marsh, Balla and McDonald's (1988) simulation study on four different data sets have shown that TLI is relatively independent of sample size. Moreover, Hu and Bentler (1998; p446) mention that TLI is less sensitive to sample size and consistently performs well even with models deviate from the multivariate normality assumptions. Thus the results here CFI = 0.993 and TLI = 0.991 demonstrate an excellent model.

According to Hu and Bentler (1999), RMSEA values below .06 indicate satisfactory model fit, our result of 0.049 is well within this criteria.

We are well aware of the inter correlations between the items and factors in our model. It would be normal practice to assign one survey item to more than one factor within the model and this would potentially increase the statistical fit of the model. We have tested this possibility and not found significant increases in model fit.



## Appendix 2 - Statistical goodness of fit tests of the items within factors

	Chi-Square for goodness of fit (Sig)	Cronbach alpha	Spearman-Brown stepped-up reliability coefficient	Spearman brown coefficient	Guttman split-half coefficient
All survey questions (including feedback questions)	0.000	0.976	0.976	0.968	0.966
All scoring questions	0.000	0.966	0.967	0.962	0.961
BC 16 questions	0.000	0.920	0.922	0.908	0.908
Leadership	0.000	0.918	0.919	0.913	0.913
My Manager	0.000	0.942	0.943	0.934	0.929
Personal Growth	0.000	0.800	0.805	0.804	0.803
Wellbeing	0.000	0.898	0.899	0.893	0.893
My Team	0.000	0.879	0.880	0.853	0.827
Giving Something Back	0.000	0.684	0.683	0.649	0.643
My Company	0.000	0.850	0.850	0.787	0.760
Fair deal	0.000	0.914	0.914	0.909	0.909

**Cronbach's alpha** is the most common form of internal consistency reliability coefficient. By convention, a lenient cut-off of .60 is common in exploratory research; alpha should be at least .70 or higher to retain an item in an "adequate" scale; and many researchers require a cut-off of .80 for a "good scale."

**Spearman-Brown split-half reliability coefficient**, also called the *Spearman-Brown prophecy coefficient* and not to be confused with the Spearman-Brown stepped-up reliability coefficient below, is a form of split-halves reliability measure. The Spearman-Brown prophecy coefficient is used to estimate full test reliability based on split-half reliability measures. The Pearson correlation of split forms estimates the half-test reliability of an instrument or scale. The Spearman-Brown "prophecy formula" predicts what the full-test reliability would be, based on half-test correlations. This coefficient will be higher than the half-test reliability coefficient.

**Standardized item alpha** is the average inter-item correlation when item variances are equal. It is also called the *Spearman-Brown stepped-up reliability coefficient* or simply the "Spearman-Brown Coefficient." The difference between Cronbach's alpha and standardized item alpha is a measure of the dissimilarity of variances among items in the set. In a second use, standardized item alpha can be used to estimate the change in reliability as the number of items in an instrument or scale varies. In SPSS, the Spearman-Brown stepped-up reliability coefficient is labeled "Cronbach's alpha based on standardized items" and is part of the default output in the "Reliability Statistics" table, next to Cronbach's alpha..

**Guttman split-half reliability coefficient** is an adaptation of the Spearman-Brown coefficient, but one which does not require equal variances between the two split forms.

The description of measures above is from;

<http://www.statisticssolutions.com/Reliability-Analysis.htm>

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