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Developing the return on workplace investment (ROWI) tool

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Abstract

Facilities managers and the wider corporate real estate (CRE) community have increasingly become focused on cost reduction, with organisations typically viewing property as a cost burden rather than an investment. Consequently, it remains rare for organisations to include performance benefits in financial investment appraisals of workplace projects. A change in narrative is required to one where value can be demonstrated rather than simply costs reduced. Previous attempts have been made to quantify workplace performance, but a tangible tool to assist in recommending major decisions regarding changes to the workplace has eluded discovery. Therefore, the authors joined forces with the Institute of Workplace and Facilities Management (IWFM) to create the Return on Workplace Investment (ROWI) tool. The ROWI tool is a ready reckoner for calculating the impact of workplace projects (including planning, design or operation) on people performance. It can be used as part of a cost-benefit analysis to help professionals build

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a business case which accounts for positive factors other than cost alone. The initial step to developing the ROWI tool was to conduct an extensive literature review to determine the performance metrics that could be used to calculate a return on workplace investment. Some 105 unique and robust literature sources, with a total of 194 individual assessments of performance, were selected. Five dominant and recurring performance metrics were identified, along with nine recurring broad workplace design elements affecting task performance. Previously, there was little confidence in productivity research due to the range in performance data that various studies produce. A unique aspect of the ROWI tool, however, is that the performance data for each study was weighted to make it more relevant to real office work. The corresponding, more realistic, potential impact of workplace design on each of the performance metrics was calculated using the weighted results from all the research studies.

Keywords: productivity, performance, office, workplace

INTRODUCTION

Background

Researchers at the Liverpool Business School of Liverpool John Moores University (LJMU) and Workplace Unlimited (WPU) discussed with the Institute of Workplace and Facilities Management (IWFM) the possibility and practicality of determining the tangible, and less tangible, benefits of workplace projects. This paper provides an overview of the resulting ground-breaking report on the development of a Return on Workplace Investment (ROWI) tool for workplace professionals, produced on behalf of IWFM.[1,2]

The productivity debate

In 2016, the Stoddart Review[3] found that a better use of workspace could provide an uplift to the performance of the UK workforce. Nonetheless, the facilities management (FM) and corporate real estate (CRE) industries have become increasingly focused on cost reduction, often viewing property as a cost burden rather than an investment that enables the workforce to perform to their maximum potential.

Many researchers define productivity as the ratio of output to input.[4,5] The output might be deliverables, sales, ideas, etc., whereas input is usually linked to time and effort. For the CRE and FM industries, however, the input may be more related to the workplace provision, such as the amount of space, its design and the facilities and the related property costs (see Figure 1). Similarly, value may be viewed simply as the ratio of quantity and quality to cost. A focus on cost therefore only represents one side of the productivity and value equation.

Reducing cost while maintaining performance and quality is technically an increase in productivity — in other words, 'getting more for less'. The problem arises when the performance or quality also drops with the decrease in costs. This problem is exacerbated by the fact that staff costs (and their monetised performance) are far greater than the property costs (such as rent and energy) by a factor of 6:1 and possibly up to 10:1, according to the World Green Building Council.[6] Therefore, a small negative impact on performance could easily outweigh any property savings. On the other hand, an increase in performance as little as 5 to 10 per cent could offset the annual property costs.[7] When making changes to the workplace planning, design and operation, it is therefore critical to monitor the impact on worker performance.

One reason for the FM and CRE industry's focus on cost, and correspondingly the amount of office space, is that performance and quality are less tangible and much more difficult to quantify. The measurement of performance is particularly more difficult in the modern workplace, because for many

sectors their workers' performance is more ambiguous than the clearly defined outputs in other industries, such as manufacturing or telesales. Furthermore, regarding workplace projects, there are established cost databases with benchmarks for small and large capital projects. In contrast, historically no such database exits of the performance benefits associated with workplace planning, design and operation. Nevertheless, there is overwhelming evidence which demonstrates that the design of an office has an effect on the health, well-being and productivity of its occupants. Despite this, the impact of workplace investment has not yet had a major influence on the mainstream corporate real estate sector, and has not adequately translated into design, finance and leasing decisions.[8]

In addition to lack of accessibility and mixed interpretation, lack of faith in the productivity research may be because many of the studies are conducted in laboratories, rather than the real world, and result in a range of performance benefits for the same design parameter. In a previous paper, Oseland and Burton[9] attempted to compile such research and to weight the results according to their relevance to the modern office. They went on to use the performance data as part of a cost-benefit analysis of workplace projects.

Of course, many factors other than the design of the workplace affect performance. Motivational theory, such as that of Herzberg,[10] distinguishes between the motivators and hygiene factors. The motivators are the ones that enhance job satisfaction and encourage people to perform better; they are mostly organisational factors such as recognition and responsibility. In contrast, the hygiene factors can decrease job satisfaction and hinder performance; they include the working conditions such as the workplace design and office equipment. The research presented in this paper and the corresponding practical tool focus on physical workplace factors rather than organisational ones.

Tool concept

In general, it is rare to include productivity benefits in financial investment appraisals in the UK. Although previous researchers

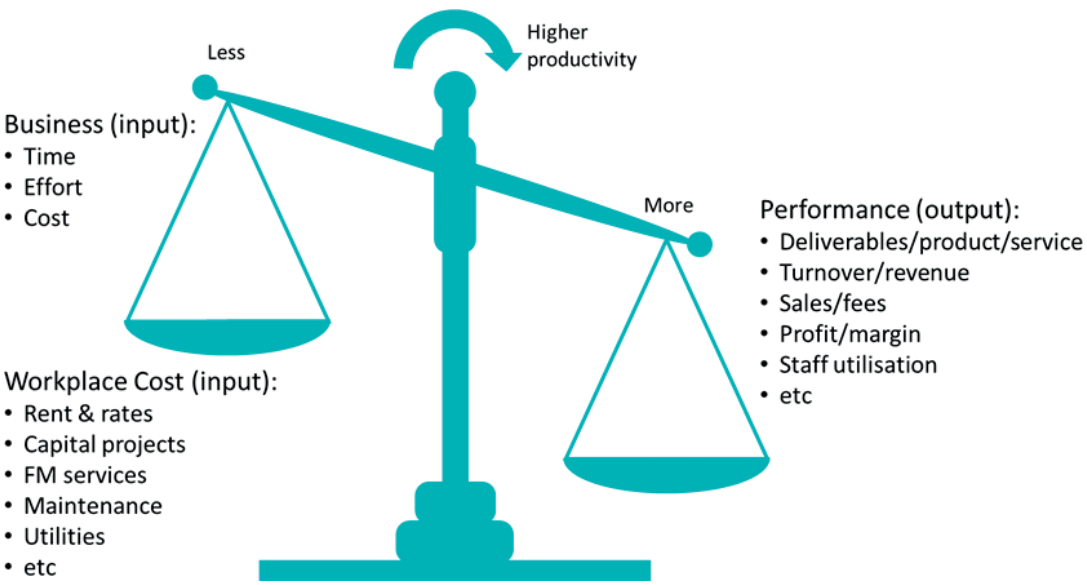

Figure 1 Productivity is the ratio of output to input

have attempted to quantify workplace performance, there is no tangible tool to assist workplace professionals in making major decisions regarding changes to their workplace environment.

LJMU and WPU therefore discussed the merits and practicality of developing a tool for workplace professionals with the IWFM. The conversation and following collaboration resulted in the concept of a Return on Workplace Investment (ROWI) methodology and tool. Following a rigorous academic process, highlighted in Figure 2, the tool was subsequently developed and is presented later in this paper. The ROWI tool is intended as a ready reckoner for calculating the impact of workplace projects (including planning, design or operation) on worker performance. This can then be used as part of a relatively straight-forward cost-benefit analysis, rather than depending on cost alone, for new fit-out or refurbishment projects.

ROWI METRICS AND PARAMETERS

Context

According to Pinder and Ellison,[11] the workplace is a triangulation of the physical space, its culture and the ability to enable technology. There is much evidence demonstrating that workplace design has an effect on on the health, well-being and productivity of its occupants.[12,13] Furthermore, Oseland and Burton[14] quantified environmental conditions on worker performance to create a business case for workplace design changes. Through a comprehensive literature review of 75 studies, they were able to demonstrate performance metrics for various environmental factors in the workplace. Since then, however: 1) the workplace has undergone many changes physically, technologically, socially and environmentally;[15] 2) many new studies on the impact of the workplace on performance have been conducted; and 3) there is a broader understanding of productivity benefits including well-being and other emerging performance metrics.

Literature review

The first step to developing the ROWI tool was to conduct an extensive literature review to better understand the variables that should be measured to calculate a return on workplace investment. This was achieved in the form of a scoping review,[16] where literature was identified and reviewed through the following sources:

- Electronic databases — using a systematic search strategy;
- Hand-searching of key journals — for specific priority journal titles;
- Existing networks and organisations — to identify industry reports and artefacts.

A final list of 88 literature sources was identified and combined with the 75 literature sources from Oseland and Burton's[17] original study. Once the sources were combined, a number of duplications (58) were detected and removed, giving a total of 105 final literature sources, provided in the authors' original white paper.[18] From the 105 identified unique research sources, a total of 194 individual assessments of performance were uncovered,

Figure 2 ROWI tool development

as some studies used multiple means of measuring performance (see Figure 3).

A detailed investigation of the 105 selected studies revealed five dominant and recurring performance metrics relevant to calculating a return on workplace investment. Each research study was then categorised according to those five overarching performance metrics identified in the literature review, as follows:

- *Increased task performance*: Refers to changes in cognitive performance tests such as memory/recall, mental arithmetic, concentration and proof-reading tasks, etc.;
- *Reduced absenteeism*: Studies that monitored, or calculated, changes in absence from work due to sickness and other factors;
- *Reduced staff attrition and increased attraction*: Relates to studies that measured the impact of the workplace parameters on staff attrition (turnover rates) or increased attraction of new staff (recruitment);
- *Increased organisational performance*: This refers mostly to high-level embedded hard business metrics such as sales, income/turnover and profitability, or softer metrics like customer satisfaction and repeat business. Team performance was also monitored in a few isolated studies;
- *Improved health and well-being*: Some research studies, mostly high-level reviews, highlighted the link between the workplace design elements and well-being or physical health.

Some 158 of the 194 performance assessments identified in the research studies related to task performance. Evaluating the impact of specific environmental parameters on task performance appears to be particularly favoured by productivity researchers. This allowed task performance to be sub-categorised according to the key workplace intervention. Nine recurring broad workplace design elements were identified in the task performance studies, as highlighted below and shown in Figure 4. It is assumed that these workplace design elements will also affect the other four performance metrics.

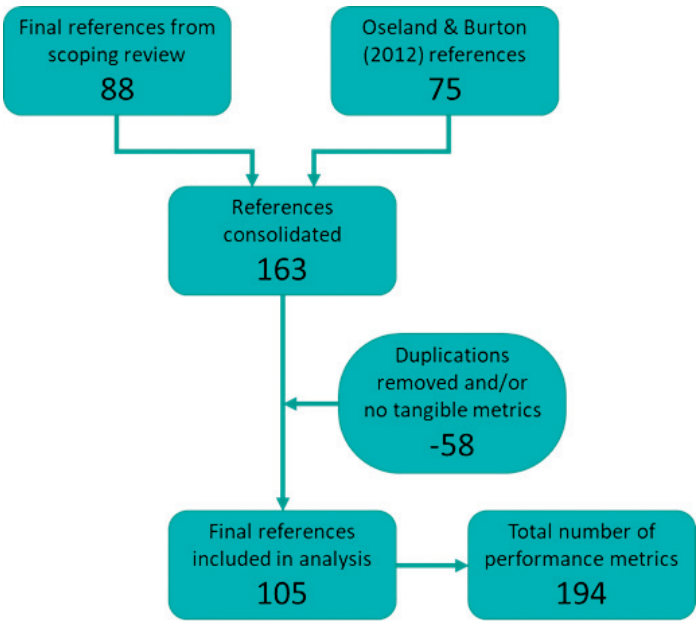

Figure 3 Selection of relevant studies

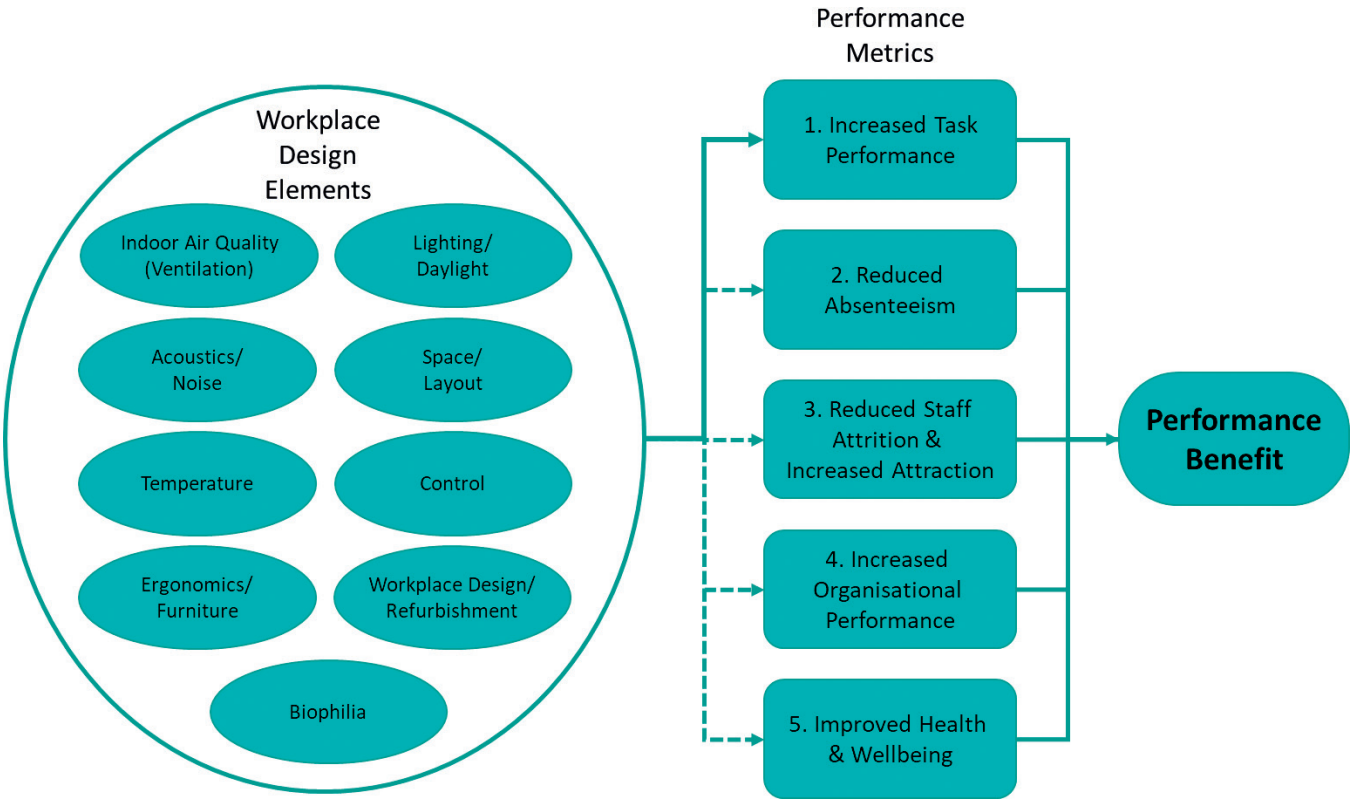

Figure 4 Five performance metrics and nine workplace design elements

(1) *IAQ/ventilation*: For example, changes to the fresh air ventilation rate or CO_2 levels;
(2) *Lighting/daylight:* For example, access to windows or changes in lighting balustrades or bulbs;
(3) *Acoustics/noise*: For example, improved sound absorption, partitions offering acoustic privacy or other acoustic solutions;
(4) *Space/layout*: For example, a reconfiguration of the desk layout, a decrease in desk density or enhanced visual privacy;
(5) *Temperature*: For example, matching the ambient temperature to optimal thermal comfort or provision of cooling in summer;
(6) *Control*: For example, personal control of (task) lighting, choice of openable windows, local control of temperature or provision of desk fans;
(7) *Ergonomics/furniture*: For example, better ergonomic chairs and desks;
(8) *Workplace design/refurbishment*: For example, a move to a newly fitted out or recently refurbished office, including design, furniture, building services, etc.;
(9) *Biophilia*: For example, introducing biophilic design elements such as plants, natural features (such as water), landscaping or views out onto greenery.

ROWI tool key variables

As mentioned, following on from the identification of the reliable research projects, the corresponding five core performance metrics and nine workplace parameters were identified. These formed the key variables that it was considered could be used in practice to calculate the return on workplace investment.

The percentage change in any of the performance metrics used in each study was determined by extracting any data identified during the literature review process. Due to the variety of data collected and the range of performance metrics, it was decided that the observed change in performance should be weighted according to the confidence in the quality of the data. To weight the data, three categorical scales were used as follows:

(1) *The objectivity of metrics*: Refers to the level of independent quantification of the performance metric used in the research. For example, a cognitive performance task such as remembering a series of numbers, or typing speed and errors, would be weighted higher than perceived or self-rated performance;
(2) *Job task relevance*: The amount of time that the metric would be used during a typical office workday. For example, computer tasks used in a research study would be weighted higher than a mental arithmetic task;
(3) *Real-world relevance*: Relates to where the study was conducted and how relevant the place is to a real-world office environment. For example, a study conducted in an actual office environment was given a higher weighting than one in a simulated office or laboratory.

All the possible categories for each of the three scales were identified. For example, for real-world relevance, the studies were categorised as: office, call centre, simulated office, lab study, not workplace, manufacturing, light industry, survey/poll, retail/store and literature review. The weighting associated with each of these categories was independently assigned by the authors of this report and any discrepancies agreed in advance. The weightings of the categories were based on the previous research,[19] recent workplace usage statistics and a further review by the authors of this report.

For each metric identified in the individual research studies, the most relevant category for the three weighting scales was assigned. An overall weighting was then automatically calculated based on the pre-agreed weighting for each category. The weighting was then applied to the reported change in performance, providing a weighted mean change in performance for each study. Table 1 illustrates how the weightings were applied to the performance results of several research studies.

The next step was to group all the studies according to each of the five core performance metrics. The median, lower quartile (LQ) and upper quartile (UQ) of the weighted performance was then calculated for those grouped studies. This high-level

Table 1: Examples of the theme sub-categories and associated weightings

Author(s)	*Performance metric* *Workplace parameter*	*Objectivity of metric* *Objectivity weighting*	*Job task relevance* *Job task weighting*	*Real-world relevance* *Relevance weighting*	*Total weighting*	*Mean performance*	*Weighted performance*
Banbury, S. and Berry, D. C. (1998)	Task performance Acoustics/noise	Performance task 80%	Concentration/ cognitive ability 35%	Simulated office 60%	16.8%	16.0%	2.7%
Kroner *et al.* (1992)	Task performance Control	Business metric 100%	PC work 45%	Real office 100%	45%	2.8%	1.3%
Vernon, H. M. *et al.* (1926)	Task performance Temperature	Manual task 80%	Manual task 1%	Manufacturing 30%	0.2%	27.0%	0.1%

data, reported in Table 2, was incorporated into the ROWI tool as key variables.

The variables relating to the workplace design elements that affected the performance metric, that is the cause or workplace intervention, were also identified for the studies of task performance studies. The median and quartiles of the corresponding weighted task performance were then calculated for each workplace parameter, as shown in Table 3. The data extracted from the research studies allows for the identification of specific workplace investment areas (parameters) that influence performance and therefore offer a potential return on workplace investment. These are included as key variables in the ROWI tool.

In summary, for each of the five key metrics and the nine workplace parameters, the median along with the lower and upper quartile weighted performance was extracted to form the bases of the ROWI tool. The whole process is illustrated in Figure 5.

OVERVIEW OF THE ROWI TOOL

The ROWI tool is fundamentally an enhanced cost-benefit analysis spreadsheet. The two upper sections are quite standard and represent a high-level cost sheet, allowing capital costs (see Figure 6, Box 1) and operational costs (Box 2) to be entered covering a five-year period. Capital project costs can be entered for just one year or split over up to five years. Some default category names for the cost elements are provided, based on RICS elemental cost planning,[20] but they can be overwritten with the user's own categories. The operational costs, such as rent, service charge, maintenance, utilities, churn, etc., can also be entered for up to a five-year period. This is unlikely to be required when evaluating the benefits of small workplace projects, but it is useful when comparing either a major fit-out or a relocation project where the ongoing operational costs may vary considerably over time. Many organisations allow for depreciation of capital costs

Table 2: The median and quartiles of weighted performance metrics

Core performance metric	*Median*	*LQ*	*UQ*
1. Increased task performance	1.5%	0.3%	3.5%
2. Reduced absenteeism	0.1%	0.1%	0.4%
3. Reduced staff attrition and increased attraction	1.9%	0.3%	4.5%
4. Increased organisational performance	4.0%	2.4%	5.0%
5. Improved health and wellbeing	0.2%	0.1%	0.6%

Table 3: The median and quartiles of task performance by workplace parameter

Workplace parameter	*Median*	*LQ*	*UQ*
1. IAQ/ventilation	0.5%	0.1%	2.0%
2. Lighting/daylight	0.5%	0.1%	1.8%
3. Acoustics/noise	2.7%	1.2%	6.7%
4. Space/layout	3.9%	2.7%	5.2%
5. Temperature	0.4%	0.1%	1.8%
6. Control	1.3%	0.6%	2.6%
7. Ergonomics/furniture	5.0%	4.5%	5.4%
8. Workplace design/refurbishment	2.8%	0.9%	8.2%
9. Biophilia including views	2.9%	1.7%	4.3%

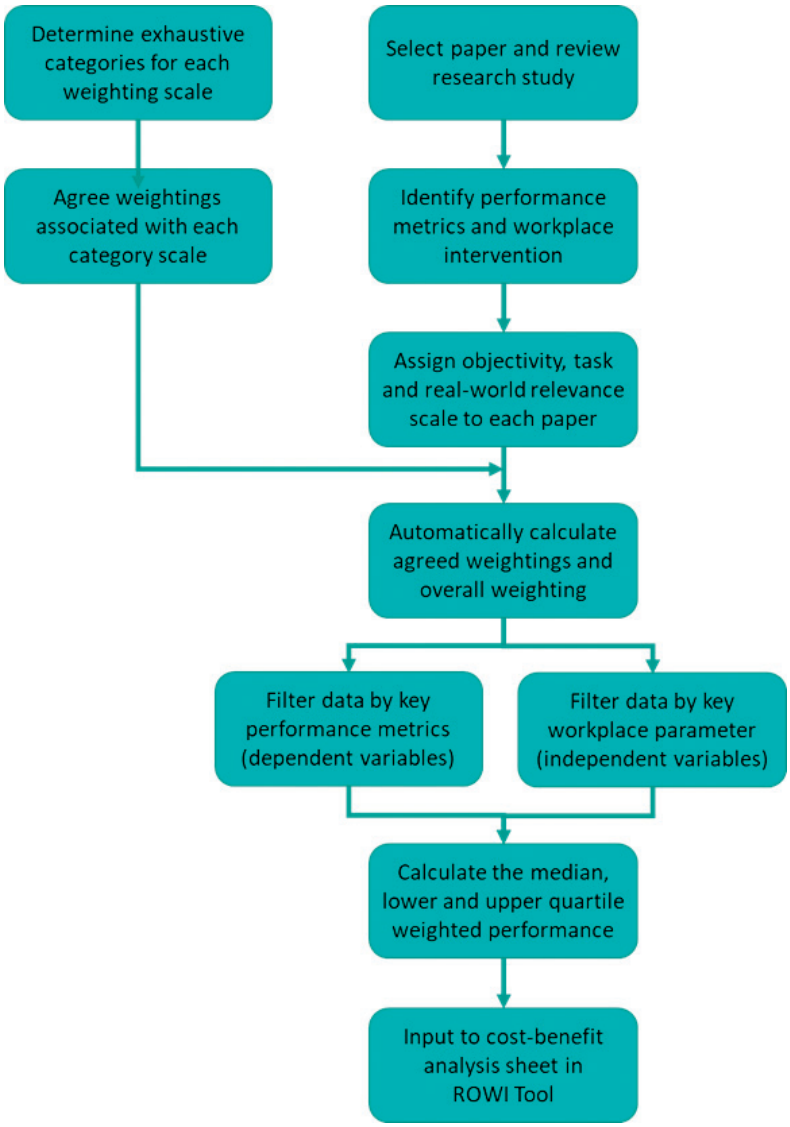

Figure 5 Process for converting research data into ROWI Tool

over time, but each have their own nuanced calculations, so the current version of the tool uses basic cost data.

The lower section incorporates the unique aspect of the ROWI tool where the impact of the workplace design on various performance benefits is calculated. The combined median and quartile performance benefits for each of the five key categories and nine sub-categories, mentioned in the previous section, form the primary input to the benefit section of the ROWI tool.

Once the costs are entered, the individual elements of the workplace project and their impact on performance can be considered. The ROWI tool allows for nine workplace design elements, all demonstrated to affect performance. Previous research[21] indicates, however, that the individual performance benefit of multiple workplace parameters cannot simply be added; the benefits are more likely to follow a law of diminishing return, with little benefit after considering five individual design elements. The impact

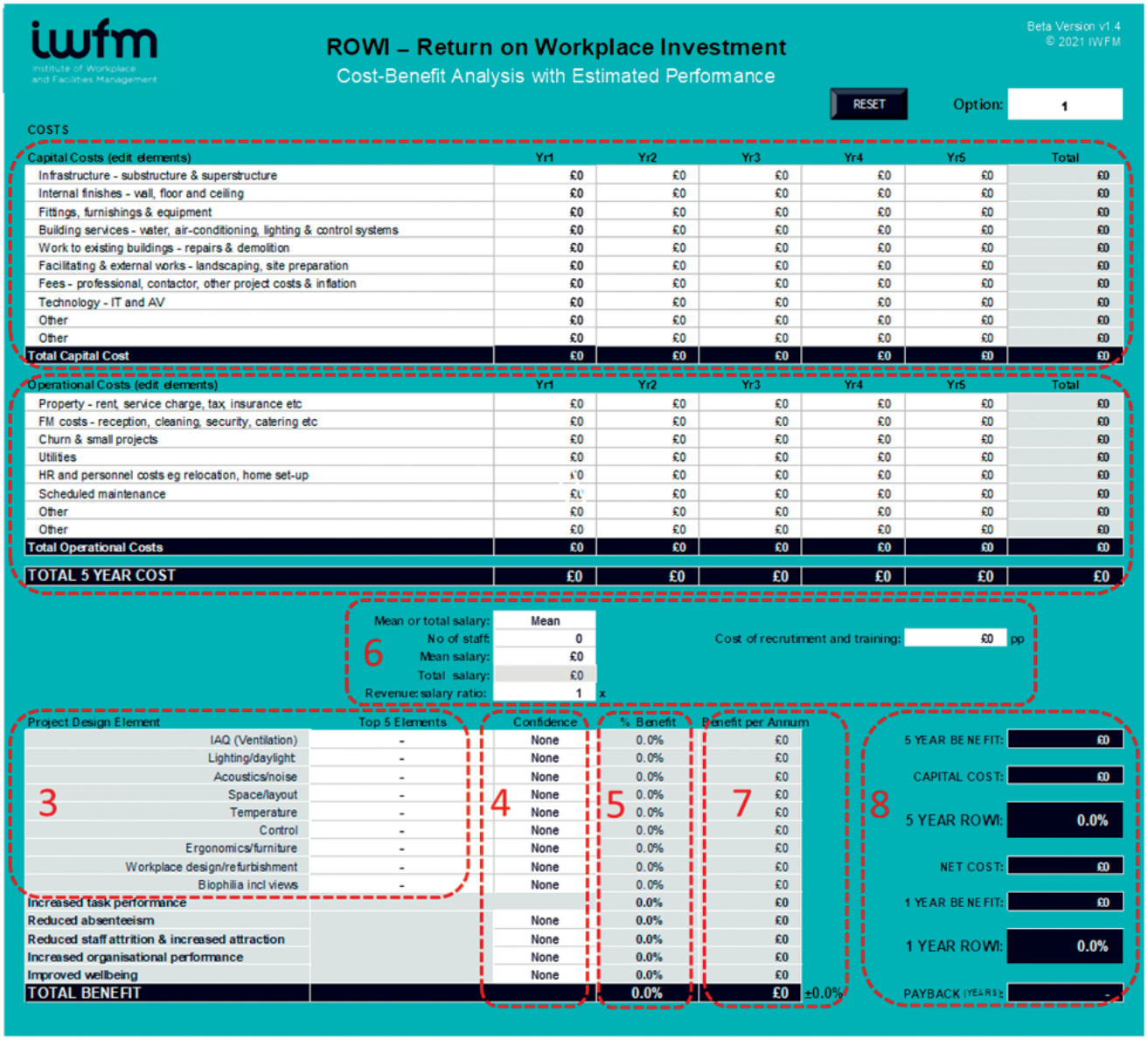

Figure 6 Key components of the ROWI tool

of each element is adjusted based on its selection order. The top five design elements are added in order of relevance to the workplace project (Box 3). The 'relevance' may be based on the investment cost or the project objectives, etc.

For each of the selected workplace design elements and the key performance metrics, the user estimates the confidence levels (Box 4). This represents how confident they are that each element will improve worker performance. Clearly this part of the ROWI tool spreadsheet is highly subjective and affects the final return. It is recommended that the project team confer on the confidence levels and enter the consensus agreed confidence level. If they are unsure, however, selecting 'low' is recommended, as this will result in the most conservative return on workplace investment. As

previously mentioned, the literature review and resulting database were used to calculate the median, LQ and UQs of each performance benefit. The LQ figure reflects low confidence and the UQ high confidence in the impact of the workplace project on performance. Consequently, the LQ figure is extremely conservative. The total percentage benefits are then automatically calculated (Box 5).

Many productivity researchers use salary data to convert a percentage performance increase into additional income, for example see Attema *et al.*[22] Therefore, to monetise the performance benefits and allow them to be offset against cost, the organisation's number of staff (affected by the project), their total (or average) salary and the cost of recruitment and training need to be added (Box 6). For many businesses, the staff are expected to generate revenue that is higher than their salary, typically three times more. A revenue-to-salary ratio can therefore be entered to reflect this. Some organisations may prefer to use the fully built-up staff costs, and this can also be reflected in the revenue-to-salary ratio.

Once the organisational data is added, then the equivalent monetary value of each performance benefit is calculated (Box 7). These are then added up to show the accumulated benefit over a five-year period (Box 8). The calculated 'net cost' represents the total benefit minus the project cost, which is a quick and easy method for comparing different project options. The ROWI is also calculated for a one-year and five-year period. The ROWI is the total monetised benefit minus the capital costs expressed as a percentage of the capital cost. A simple payback period is also provided.

The tool allows for multiple models (spreadsheets) to be tested, one of which could be the current situation. The tool is aimed at testing scenarios relative to each other, which accounts, to some extent, for any organisational and existing factors.

DISCUSSION AND NEXT STEPS

This paper provides an overview for the beta version of the ROWI tool. The beta version is formatted in Excel, but the next phase is to create an online version that ultimately captures project information to validate the tool and to allow benchmarking and trend analysis. The next step is to test the beta version with legacy project data and proposed projects within a leading corporate organisation, and to overcome the limitations of the current version.

This paper presents a practical tool, rather than theory alone, for capturing the value of workplace projects by accounting for the potential performance benefits rather than cost alone. A previous, much simpler version of the tool was used successfully in a project at the Atomic Weapons Establishment.[23] Nevertheless, the current version has its limitations, but it is intended that it will develop and become more acceptable as more data becomes available and as it is used in practice by more willing organisations.

The ROWI tool is focused on the impact of workplace design on worker performance, but clearly many factors affect performance. While important organisational factors are not captured, the tool allows for the relative changes in performance benefits of difference projects or scenarios to be calculated within the same organisation. In such comparisons, most of the organisational factors will remain constant. The work patterns of office workers have changed over the last few years due to the COVID-19 pandemic. As mentioned, the tool focuses on the performance benefits due to workplace design, which may accompany changes to work patterns and work styles.

The tool is based on the research to date that shows clear quantified effects on performance due to workplace design elements. Going forward, as more data becomes available, other factors such as technology, office operation and workplace strategies can be incorporated. Much of the current research

focuses on task performance, and while some papers capture creativity tasks, more research is required on the impact of design on creativity and collaboration, etc. in the office.

The tool also focuses on individual performance, but organisational performance has been included, based on the limited data available. Enhanced individual performance ultimately leads to better team and increased organisational performance. The potential for double-counting individual and organisational performance has been accounted for in the tool.

While the ROWI tool is by no means perfect, it is a unique practical tool that assists in forecasting the performance benefits of good workplace design. At minimum the ROWI tool facilitates a discussion on value rather than cost alone for evaluating workplace projects.

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