



## Measuring Knowledge Worker Productivity

*In 2013 and 2014, a research team formed by Advanced Workplace Associates (AWA) and the Center for Evidence-Based Management (CEBMA) set out to determine what is known about effectively measuring knowledge worker productivity. Allsteel was one of the sponsors of this important work. AWA, a London-based workplace strategy consultancy, partnered with CEBMA, an Amsterdam-based organization who “researches” research, to undertake a critical appraisal of the best available academically rigorous evidence about how the productivity of knowledge workers can be measured – reliably and with validity.*

We think it's fair to say that everyone associated with workplace making – from workplace strategists, furniture manufacturers, planners/designers, real estate, and facilities managers to the organization for whom the

workplace is developed – has been seeking the Holy Grail: a universal, broadly applicable metric for measuring knowledge worker productivity. If only we had it, we could prove that our choices – lower panels, white noise, blue walls, more natural light, etc. – have a positive effect on productivity (or not). We'd be able to prove causation, and have clearer answers about what **to** do and what **not** to do to contribute to worker performance – to have proven data instead of subjective opinions.

AWA, CEBMA, and their sponsors<sup>1</sup> set out to search for evidence once and for all that such indisputable metrics exist. To identify any and all cause and effect relationships between some aspect of the physical or virtual workplace environment and measureable performance of the knowledge worker occupant. To do so, CEBMA conducted what they call a “rapid evidence assessment” to comb through scholarly, peer-reviewed research published between 1990 and 2013. They extensively searched all major academic databases against a carefully defined set of criteria designed to ensure that only the best quality evidence was included in the study and weed out those that represent merely collective opinions or the latest fad in thinking.



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<sup>1</sup>This research project was sponsored by eight organizations in knowledge sectors such as banking, energy, and telecommunications: Allied Bakeries, The British Council, BDO, BP, RBS, Telereal Trillium, and Old Mutual Wealth in the UK, and Allsteel in the US.

In attempting to answer this burning question, they formulated a number of related questions. What is meant by knowledge work? What are the appropriate measures? And, how do they relate to organizational, team, and personal productivity?

## Knowledge Work

We often think of knowledge work in terms of what it is *not*: manual, physical labor requiring body strength or coordination; or something we do routinely, following a consistent set of steps. The term knowledge work was coined in 1954 by Peter Drucker to describe work that occurs primarily because of mental processes rather than physical labor (Drucker, 1954). Since then, many other definitions have been put forward, but they all seem to share several common elements:

- Distribution or application of knowledge
- Highly educated, autonomous professionals
- A work process that is difficult to standardize
- Complex and intangible outcomes

## Appropriate Methods for Measuring Knowledge Work

It is widely agreed that, in most cases, we can't simply measure knowledge worker productivity by applying the same approach we've used in manufacturing for decades. In general, manufacturing metrics are based on contrasting input and output or the relationship between production of goods and services and the factors of production used (labor, machinery, raw materials, etc.).

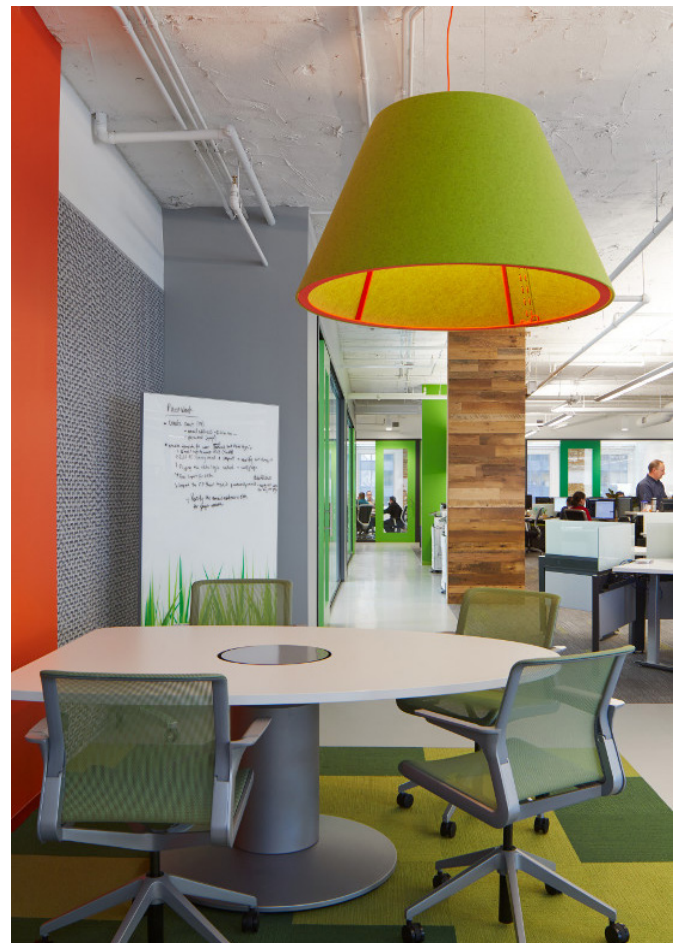
While in some cases this productivity formula also applies in the context of knowledge work, research indicates that the higher the level of knowledge work, the more difficult it is to quantify or qualify the results of knowledge worker effort. *More complex knowledge work seldom has one single correct or standard outcome, nor are those outcomes usually quantifiable or comparable.* In addition, the *value* of those more complex forms of knowledge work is often determined by the customer for it. And even that is subject to the view of the user. *Quality*, for example, depends on what is defined as quality by an organization or the perception of a customer.

In addition, many studies and meta-analyses have demonstrated that, in general, the correlation between

subjective and objective productivity measures tends to be low – and therefore they cannot be used interchangeably (Alexander & Wilkins, 1986; Hoffman et al, 1991; Bommer et al 1995; Rich et al 1999; Forth & McNabb, 2004).

**In other words, there is no standard or single, widely acknowledged metric, method, or set of key performance indicators for measuring the more complex forms of knowledge worker productivity.** Knowledge work is so varied and its outputs so intangible that it is not possible to come up with a single universal measure. And, while we might hope that in lieu of that, we can apply related measures like self-reported engagement or other survey data – the subjective measures we mentioned in the above paragraph – very few of them are valid and reliable. Interesting and informative, yes, but – with a few exceptions we'll discuss below – not scientifically proven proxies for productivity measures.

Having said that, organizations can develop situationally relevant metrics for a specific type of knowledge work within a specific organizational context. A team of product





developers may have goals for a particular project, for example, like shortening their usual cycle time or for a target sales volume in the first six months after launch.

So if the bad, but not terribly surprising, news is that there is no Holy Grail, no clear evidence of a valid, universal cause and effect measurement system we can reliably apply, what's the good news? While CEBMa's assessment confirmed that there are not any macro effective causal relationships – "if I do this, I will get 'X' result" – **they did, however, find several scientifically proven, broadly generalizeable correlations<sup>2</sup> or "proxy measures"** – "if this is happening, chances are great that 'X' is also happening."

### How These Factors Relate to Organizational, Team, and Personal Productivity

The strongest correlations they uncovered are all related to a team's performance. Most of the studies they found conclude that knowledge worker productivity should be assessed on the team level, because:

- Knowledge work is not an individual task, but usually performed in collaboration with others on complex tasks that they cannot perform alone.
- Team productivity is not simply the sum of individual productivity.
- Changes in productivity of an individual knowledge

worker may not affect the productivity of other knowledge workers.

- The overall productivity of the organization is dependent on the contribution that specific organizational levels (departments, business units, divisions) make towards overall organizational goals.

From the review of more than 800 individual research papers and 35 meta analyses, the six factors that had the highest statistical association with the performance of teams involved in knowledge work are:

- Social cohesion
- Perceived supervisory support
- Information sharing
- Vision and goal clarity
- External communication
- Trust

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<sup>2</sup> We want to reinforce the importance of the distinction we're making between "causation" and "correlation" because these terms are often confused or used incorrectly. Causation refers to something that results in an *effect*. If water is heated past its boiling point it will boil. We would all like to have some proven list of workplace attributes – like painting a wall blue – that would result in higher productivity. This is what we're saying has **not** been established. Correlation, on the other hand, suggests a relationship between two or more things – if I increase X, Y typically increases or decreases. CEBMa was able to identify several factors that seem to be reliably correlated to certain types of team performance.

Knowing these six factors so closely correlate to team performance enables us to focus on what truly matters. This new information will enable organizations to prioritize activities beyond the design of the physical environment – aspects of organizational culture, leadership and management behaviors, performance management systems, workplace design, and technology deployment – to improve social cohesion between teammates, the supportive role of the manager, effective internal and external communication and information sharing, goal clarity, and trust.

### Social Cohesion

The factor with the strongest correlation to team performance is social cohesion. High levels of social cohesion create a psychologically safe environment in which team members feel free to innovate and explore new ways of doing things, take judicious risks, and cooperate and interact with each other. As a result, an exchange of ideas and sharing of information and knowledge is more likely.

The strength of the correlation between cohesion and performance depends on the type of team. For example, it strongly predicts performance in teams with uncertain and

complex tasks (e.g., major project or R&D teams), and has a higher association with performance in knowledge work teams rather than in production work teams. The research identified four topics that appear to be particularly associated with team performance. These include: team bonding, promoting a safe psychological environment, developing and deepening relationships, and strong interpersonal skills that support development of social cohesion (e.g., consideration, trusting, friendly).

It may be obvious why social cohesion is so fundamentally important. In a knowledge business, every person is a knowledge asset bringing to the team and organization the knowledge, experiences, and relationships gathered throughout their lives. It is the fusion of one person's knowledge, experience, and relationship assets with those of others in the organization that creates the new knowledge that propels the organization forward and eventually turns into commercial value. For that to work, people need to be willing and comfortable contributing their knowledge and ideas.

Social cohesion involves perceptions and feelings, so self-assessments are the most valid method of measurement (as opposed to assessments made by external observers such as managers).





A sample question – to which respondents can select from a range of five ratings from “strongly agree” to “strongly disagree” – might be: “Members of our team help each other on the job.”

### Perceived Supervisory Support

Perceived supervisory support has been shown to have a positive association with knowledge workers’ team performance, and was even more important for teams with roles that span team and/or organizational boundaries. Perceptions form when team members receive feedback from and interact with their supervisor. They are strengthened by team members’ feelings about supervisor help (e.g., giving praise in time of need), or for extra effort. Team members perceive supervisory support in a positive way when a supervisor builds a positive motivational climate. This leads to teams feeling more satisfied in their work.

Research shows that team members’ perception of supervisor support impacts their performance, organizational commitment, job satisfaction, and turnover intentions. Recent research has also highlighted those

particular behaviors and competencies that foster positive perceptions of supervisory support, such as:

- Setting a positive emotional tone and demonstrating integrity.
- Proactively problem-solving workload issues.
- Being available to the team, encouraging team discussion, understanding what motivates the team and individuals.
- Managing conflict fairly and following up on issue resolution.

As a result, supervisors who treat team members well can expect them to act in ways that are of mutual value.

An example of a question that can be used to measure perceived supervisory support, using the same rating scale as before, is: “My supervisor is willing to extend him or herself in order to help me perform my job to the best of my ability.”

Many organizations already gather data through existing surveys or performance measurement tools, so it is worth seeing what is already gathered along these lines before creating new initiatives.

### Information Sharing

In this context we use “information sharing” to refer to the extent to which teams utilize each member’s distinctive knowledge for the team’s benefit – and members are willing and happy to make their knowledge available for others to share. Information sharing enhances innovation and team performance, and has particular importance when team tasks and problems are complex and involve developing new ideas. Therefore, it is particularly critical in organizations that rely on knowledge-worker teams to deliver products and services. Essentially, it is how teams build a mutual understanding of their collective knowledge held in the form of collective memory that enables information sharing.

The positive effect of information sharing on team performance is explained by:

- Decision making: As more team members share information, the better their decisions will be, leading to better team performance (Hackman, 1990).



- Team processes: Enhanced coordination and more efficient and effective team processes result. They create a common understanding of work being done, and awareness of “who knows what” in the team.

An example question, using the same rating scale as before, is: “Our team members share their experience or know-how with other team members.” As noted above, it is worth seeing what information is already gathered on this topic before creating anything new.

### Vision and Goal Clarity

Essentially, “vision” sets direction and “goal clarity” specifies what the team should focus on.

Studies have demonstrated that a clear team vision tends to positively impact team performance. While clearly stated goals seem to help team members channel their efforts, they also give their work meaning, and in turn, motivate teams to enhance their performance. When team members are committed to those goals, and share a sense of purpose and responsibility, team effectiveness is enhanced. As a result, team members have a common direction, and this enhances cooperation.

More than that, clear goals help team members connect their personal values and team values, and experience more meaning and self-affirmation from their work. Finally, a clear vision, owing to its future focus, provides both a rationale for the team’s existence and standards by which team performance can be measured. As such, a clear vision and commitment to long-term goals helps encourage judicious risk taking, experimenting with new approaches and team member responsibility to produce results.

The research identified five topics that appear to be particularly associated with team performance:

- A shared team vision
- Goals that are challenging and achievable
- Discussion of long-term goals with the team
- Provision of regular feedback
- Commitment to team goals

An example question is: “If I have more than one goal to accomplish, I know which ones are most important and which are least important.”

## External Communication

By external communication we mean team interactions that include being "...proactive with outsiders, seeking information and resources, interpreting signals, and molding external opinion."

Research shows that external communication requires teams to span across boundaries, both within the organization and sometimes with teams in other organizations. Teams involved in external communication were found to undertake four activities:

- Mapping the environment outside the team in order to know who supports or does not support the team.
- Persuading and influencing to represent the team in a positive light if resources are needed or, if necessary, in a less positive light.
- Coordinating plans and deadlines, and negotiating to align them with other teams.
- Synthesizing, interpreting and contextualizing information from outsiders to integrate it into existing databases. Only then can a team act on it.

External communication fosters innovation through interpersonal relations with people outside a team or organization. The more external communication team members experience with other teams, the more likely

they are to be innovative, as access to diverse information and connections with people from different backgrounds and viewpoints reduces team pressure to conform to existing ideas. Also, networks of professionals may be particularly helpful to knowledge workers since they are particularly valuable sources of new knowledge and ideas.

Interactions with outsiders enhance the likelihood of obtaining new knowledge and perspectives. These in turn spark the development of new ideas (creativity) or the adoption of new ways of doing things (innovation). Teams participating in external communication can also experience better technical quality, faster delivery to market, and being more often within budget.

The research identified three topics that appear to be closely associated with team performance:

- Access to relevant and important external networks.
- "Boundary spanning" activities (i.e., operating beyond the team's own boundary).
- Support for new knowledge and ideas.

An example question, using the same rating scale as before, is: "Our team scans the external environment for ideas and solutions."



## Trust

Trust is "...created by the expectation that the actions of the other person(s) will be at one's benefit or at least not detrimental to him or her." It refers to feelings about having regard for others.

Positive exchanges of expectations and experiences are important for building trust. Demonstrating trust, worry that another person's actions will be based on self-interest. Trust seems to develop in two directions:

- Horizontally: directed at colleagues and team members. Teams expect decisions by team members to take collective interests into account, rather than act only in self-interest.
- Vertically: the trust employees have in management to take into account the interests of employees when taking actions.

In addition, procedural justice – the fairness of the procedures used to determine organizational outcomes – is an important mechanism that operates within things like performance appraisal systems, professional development opportunities and job security; and tends to explain perceptions of management trustworthiness.

There is a positive relationship between trust and team performance; leading to positive consequences such as acceptance of influence, openness in communication, team commitment and cooperation. Team performance relies on an individual team member's willingness to share and exchange information and knowledge. Therefore, trust in team members promotes a shared direction towards common goals over personal interests. This comes from:

- The efforts individual team members make towards realizing team goals.
- The efficiency of teamwork when team members are focused on the same goals.
- The vertical trust needed to align team and organizational goals.

An example question, using the same rating scale as before, is: "Our team members do not withhold information from each other."

## Armed With This Information...

So while there is no definitively clear evidence that any generalized and reliable methods of measuring knowledge worker productivity exist, AWA and CEBMA did find six factors that are closely associated with the performance of teams involved with knowledge work; and that can credibly act as "proxy measures."

And while none of these factors are spatial in nature, they give those of us involved in "workplace making" very valuable insights into how team performance might be positively impacted by the way space – and especially the thinking behind its allocation and the protocols for its use – can support the behaviors we're after. For example:

- the breaking down of any physical or procedural barriers to visibility or information sharing would be valuable;
- as would leveraging "free address" seats to enable leaders to sit with their people and provide coaching, or to enable a related team's member to co-locate with a team to coordinate or consult;
- or placing white boards in a central location within the team to record and make visible their vision and objectives, or their milestones and work-in-progress so there's no doubt as to what they (and others) are about;
- and finally, one rationale for open plan might be to make visible the activities, trials, and tribulations of leaders so that nothing seems to be secret, and trust is engendered.

These insights clearly give us even more reasons to partner with other functions within our client organizations to connect the dots between space, resources, policies and management practices, and other forms of behavioral support to enable a holistic approach to optimizing the work of the organization.

At Allsteel, for example, our HR group holds what we call "two-ways" each quarter. These meetings are designed to facilitate discussions between members, leadership and managers about how we're doing against our plan, and what initiatives are being kicked off to support a particular aspect of the plan; or to ask for more information about whatever's on their minds. These are typically held in open areas so members can join in at any time or simply know



they're happening and are not secret. HR makes note of any action items and follows up to ensure commitments are kept; and reports on the nature of the discussion to all members.

We also – through both our process improvement teams and our performance management systems – coach our teams to set explicit goals and hold each other accountable. We use visual persistence to make the work of a given team visual and visible (like the example above), and invite other related teams to periodic updates on the given team's progress.

Another example is removing barriers and working to reduce behaviors that make others unwelcome in any team's space – such that they are made to feel like outsiders. One team AWA worked with (having just introduced an agile office) found that it was now much easier to sit with other teams, find out more about what they do and generally improve relations between the teams. This would have been much harder if each team's area was strongly demarcated and everyone had their own desk – strongly personalized and littered with files and paper – making it difficult for an outsider to feel at home

and welcome. They also used their new open breakout areas to hold team meetings and invited members of other teams to attend. Holding these sessions in neutral, non team-specific space increases comfort levels and involvement. These are simple measures, but not so simple that anyone had really thought of doing them before being introduced to the importance of the six factors!

Another progressive AWA client immediately extended the six factors thinking to their partners and customers. They started to think of ways in which they could improve working relationships by examining how well the factors were operating between the company and their business partners. For them, the six factors provide a new language and basis for discussing and enhancing relationships. Another AWA client proactively has their leaders sit with different groups every month to increase cohesion.

All this suggests that organizations that depend heavily on the performance of their knowledge workers for business success should carry out a holistic and systematic review to test the degree to which these factors are played out in day-to-day business life. Also, they should examine the underlying culture, value structures, leadership behaviors and infrastructure their organizations have to establish how well they support the six factors. ■

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As a by-product of the research, AWA has developed two assessment tools to help organizations and teams understand the level of knowledge work they are undertaking in their roles and how well their teams are operating on the six factors. These diagnostics can be used alongside a set of guidelines for developing and improving the team's performance, based on AWA's experience in helping improve organizational performance. AWA recently commenced a live trial of the tools and methodology with London & Partners – the official promotional company for London. AWA's Managing Director Andrew Mawson and Director of Research & Development Karen Plum are available to discuss the research and the tools they've developed. [www.advanced-workplace.com](http://www.advanced-workplace.com) or call +44 (0)20 7743 7110.

*Portions of this paper were adapted from two other documents written by AWA and CEBMA: "The 6 Factors of Knowledge Worker Productivity", 2015; and "Raising Office Worker Productivity", 2014.*

# Postscript

As we described at the beginning of this paper, CEBMa advocates what they call an Evidence-Based Management Approach. We thought it might be helpful to share the way they explain that in more detail.

“The starting point for evidence-based management is that management decisions should be based on a combination of critical thinking and the best available evidence. By “evidence” we mean information that comes from scientific research, internal business information, and even personal experience. In principle, then, all management decisions need to be based on real “evidence” derived through a scientific process. This process not only involves knowledge of the research field and methodology, but also – and particularly – teaching students and managers how to think scientifically in order to counterbalance to subjectivity of their own judgement.”

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# Authors

**Karen Plum**, Director of Research & Development, and **Andrew Mawson**, Founding Director, are with **Advanced Workplace Associates**, a London-based workplace consultancy. Formed in 1992, AWA is a leading change management practice that uses workplace science to make a step change in organizational performance. AWA has a team of over 20 workplace professionals skilled in Business Strategy, Program Management, Workplace Strategy, Cultural Change Management, Space Planning, Facilities Management, Interior Design, and Technology.

*Karen is a workplace cultural change specialist, and facilitates the implementation of change strategies associated with the introduction of flexible and agile ways of working. Karen also led the first two research programs on Productivity and Virtual Workforces and will direct additional research projects planned through 2015/2016.*

*Andrew is a leading thinker on the evolution of work and the workplace. Passionate about the unanswered questions that trouble organizations, Andrew pioneered the formation of these research initiatives with CEBMa to fuse academic research with practical application. He is closely involved in the research and guides the development and application of new processes and tools that are derived from the research results.*

## About CEBMa

CEBMa is a non-profit member organization dedicated to promoting evidence-based practice in the field of management. They provide support and resources to managers, consultants, teachers, academics, and others interested in learning more about evidence-based management. CEBMa is supported by several leading universities, including Carnegie Mellon, Stanford, New York University, University of Toronto, University of Bath, and the Free University of Amsterdam.

**Jan Johnson** is the Vice President of Design and Workplace Resources at **Allsteel**, a US-based office furniture provider. Allsteel works to demystify the office planning process by helping customers align their workplace strategy with their business strategy. With an extraordinarily accessible team of partners and a highly adaptable portfolio of furniture and architectural walls, Allsteel addresses customers' needs across the entire workplace – today and tomorrow.

*Jan has spent her career strengthening the correlations between business strategies and the planning, design and management of workplaces. She is a highly respected workplace strategist; leads Allsteel's Workplace Advisory team; and frequently writes, speaks, and teaches.*

## Workplace Advisory at Allsteel

The Workplace Advisory team listens. And we apply research and our extensive workplace experiences and insights to assist organizations develop and implement a situationally appropriate workplace strategy: one that aligns with their organizational culture and business goals, supports their workers' ability to work effectively, utilizes their real estate assets as efficiently as possible, and is highly adaptable to changing business and work practice requirements.

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