

Employee performance in the knowledge economy: Capturing the keys to success

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Abstract: The present study examines the key determinants of employee performance in a knowledge-intensive service firm located in the UK. Using data from a pilot study, we mapped eight performance-related behaviors to two measures of global performance to isolate the strongest predictors of the latter. We also examined the degree to which these associations varied depending on whether employees or their managers reported on performance as well as according to the degree of complexity (eg, ongoing learning, multitasking, problem solving, etc.) present in workers' jobs. Findings revealed that more traditional employee performance-related behaviors (eg, dependability) as well as behaviors that have likely increased in importance in the knowledge economy (eg, sharing ideas and information) accounted for the most variance in *reported* global performance. Sharing ideas and information was a particularly important predictor for workers in complex jobs. When the performance-related behaviors were regressed on the organization's annual employee appraisal ratings, only dependability and time management behaviors were significantly associated with the outcome. As organizational success increasingly is dependent on intangible inputs stemming from the ideas, innovations and creativity of its workforce, organizations need to ensure that they are capturing the full range of behaviors that help to define their success. Further research with a diverse range of organizations will help define this further.

Keywords: employee performance, knowledge economy, job complexity

Introduction

Accurately measuring and capturing the actions and behaviors that contribute to employees' performance on the job has been the focus of many researchers for the past 50 years. Campbell was one of the first researchers to move away from the measurement of outputs, sales targets or pay rises to proxy employee performance, in favor of a system that identified employees' job-related behaviors that contributed to the goals of the organization.¹ These behavior-based performance measurement systems remain the gold standard today and serve many practical functions within firms. The information garnered from such measures is used for hiring purposes, planning promotion and progression, devising training systems and, more generally, helping employees improve their performance.^{2,3}

It is increasingly acknowledged that employee performance is a multi-dimensional construct, consisting of distinct sets of behaviors that together influence overall organizational functioning.² In addition to assessing the job specific behaviors that characterize performance, performance assessments also frequently capture more general behaviors that are not necessarily related to employees' core functions, but are nonetheless considered important to overall performance.^{4,5} Although studies vary, four sets of performance-related behaviors are typically examined.⁵⁻⁹ First to consider are behaviors related to task performance. These include meeting timelines and production goals as well as the proficiency with which employees perform the

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tasks that are specified in their job descriptions. Second, organizational citizenship encompasses the range of “extra role” behaviors that often are not formally included in job descriptions including helping others, promoting the organization to outsiders, suggesting ways the organization can improve and employee loyalty. Similarly, employees’ ability to communicate, get along with others, demonstrate respect for colleagues and work effectively as team members are a third set of behaviors that are increasingly viewed as crucial to overall employee performance. Finally, counterproductive behaviors such as unethical behavior or unexcused absences are also considered. The present study does not focus on this fourth set of behaviors.

To some extent, task performance, organizational citizenship and interpersonal skills can be distinguished by whether they capture prescribed or more discretionary behaviors.^{10,11} That is, completing tasks and meeting deadlines are basic elements of a job that we would expect most employees to acknowledge as important, and are relatively easy to capture via observation or assessment. In some cases, these behaviors may be job role specific. On the other hand, behaviors related to organizational citizenship, teamwork and interpersonal competence focus on more abstract features of jobs that likely go outside of the boundaries of typical employee performance measures and can be subsequently transferred from one job to another.

While moderate associations have been observed between the various components of employee performance,^{10,12} a key to understanding and facilitating better employee performance is determining which aspects of employees’ behaviors and actions are most influential on their overall performance. By and large, task performance generally accounts for more of the variance in overall performance relative to contextual behaviors.^{9,10} Interestingly, one study suggests that while the behaviors related to task performance might be more amenable to training and instruction than contextual behaviors and teamwork, the latter may be increasingly important as service-related jobs become more abundant across the economy.⁶ Furthermore, the links between specific behaviors and overall performance may be dependent on who is assessing employee performance.

The rise of service-related jobs has occurred as part of a larger shift in the economy frequently referred to as the “knowledge economy.” The knowledge economy took form as general purpose technologies became ubiquitous, markets were increasingly globalized, consumers and businesses began demanding higher value-added products and services and highly-skilled workers grew in supply. As a result, over

the past decade, employment within the developed world has largely shifted from a manufacturing base to a service base including, at the higher end, knowledge-intensive services, which include high-tech services (ie, R&D, computing), insurance and financial services, market knowledge services (ie, communications, travel, business services) and other knowledge services (ie, health, education, recreational, cultural). Within the UK, the growth of the knowledge-based services sector has increased employment by nearly two million workers between 1995 and 2005, an overall rise of 17%.¹³ Contrary to the past where physical inputs and manufactured outputs drove productivity, the key to organizational success among knowledge-intensive firms is their accumulation of “intangible” assets including research, design, development, creativity, education, science, brand equity and human capital. These assets are generated directly through the abilities, ideas and innovations of the workforce.

The shift to the knowledge economy likely has had implications on the performance-related behaviors that are valued most in the workforce. Recent UK-based workforce surveys revealed that all workers, regardless of occupation, needed to effectively communicate, engage with customers and clients, collaborate with others and problem solve on a regular basis in their jobs.^{14,15} While job complexity has increased generally across occupations over the past decade in the UK,¹⁵ research has also revealed that there were distinct types of workers in the knowledge economy, distinguished by the frequency with which they used high-level tacit knowledge to complete their everyday work tasks.¹⁴ The most highly-skilled workers used and applied knowledge flexibly to enable long-range planning, conceptualize new ideas and opportunities, develop strategy and engage in complex analytical tasks. Further, many of these core “knowledge” jobs required ongoing, on-the-job learning.¹⁵ The whole of these findings suggest that aspects of performance relating to teamwork, helping others and sharing information relative to more task- or time management-related indicators may be increasingly important in the knowledge-intensive services industries, and that the relevance of various performance-related behaviors may vary depending on the level of complexity (eg, learning new things, multitasking, problem solving, etc.) workers’ face on the job.

Beyond the aspects of performance that are most important in today’s knowledge economy, it is also crucial to consider who is measuring employee performance. There is a large body of research examining the extent to which different “raters,” whether they are employees

themselves, managers, peers or subordinates, assess employee performance consistently.^{2,12,16,17} The rationale behind incorporating diverse assessments is that each rater views an individual employee's performance from a different perspective. For example, managers might be more tuned into aspects of employees' task performance, simply because they are ultimately responsible for meeting targets and keeping to budget. While we might expect some differences by rater in average performance ratings (eg, managers give lower ratings than employees), there is little evidence that the overarching concepts measured in many performance assessments diverges between raters.^{2,16} Indeed, using performance ratings from more than one person might increase the reliability of the assessment and prevent self-rater bias, whereby employees form inflated ratings of their own performance.^{17,18}

The present study examines employee performance in a large knowledge-based service firm located in the UK. The overarching aim was to elucidate the key performance-related behaviors in the knowledge economy and whether these core behaviors vary depending on the degree of complexity (eg, ongoing learning, multitasking, problem solving, etc.) present in employees' jobs. Using data from a study that piloted a new multi-rater (employee- and manager-report) employee performance assessment designed to be applicable to a diverse range of employees working in various sectors across the labor market, we explore several research questions. First, we look at the links between various aspects of employees' performance-related behavior (eg, teamwork, dependability, commitment, effort, time management) and their overall performance using both a global performance assessment as well as the organization's own annual performance ratings used as part of their appraisal process. Here we wish to assess which performance-related behaviors are most predictive of overall performance. Second, we assess whether these links are robust depending upon whether employees or managers report on employee performance. Third, using job complexity as a proxy for high-level knowledge work, we examine whether the associations between the performance-related behaviors and global performance vary depending on the level of complexity present in workers' jobs. Finally, we explore how the analytic findings parallel employees' and managers' perceptions of the key performance-related behaviors that are most important to overall performance.

While the data focus only on one organization, our survey attempts to incorporate several important methodologies including capturing a range of performance-related constructs

applicable to diverse employees, collecting multiple ratings of employee performance, measuring other important features of employees' jobs (eg, job complexity, job quality, organizational culture) and contrasting the survey results with formal annual performance ratings. As data are collected from alternate organizations, further research can examine how job quality and other organizational features impact on employees' performance.

Methods

Design and measures

The data from the present study were collected as part of a pilot study examining employee performance in knowledge-intensive industries in the UK. The main objective of the study was to develop, pilot and validate an online multi-rater, multi-dimensional employee performance assessment that was easily and quickly completed by employees and their managers and was adaptable across diverse organizations. Secondary objectives of the study included: (1) assessing differences in the patterns of responses between employees and their line managers; (2) exploring relationships between performance ratings and the perceived importance of different indicators; and (3) assessing links between the performance indicators and assessments of employees' global performance.

Based on a literature review to determine the major concepts and domains associated with work performance, we compiled our own survey instrument with a series of 65 performance-related behavioral items that could be feasibly answered by both employees and their managers. The survey tapped into a range of constructs including teamwork, organizational citizenship, interpersonal competence, customer orientation, dependability and effort. Many of the items overlapped conceptually, but one of the aims of the pilot study was to prune the survey items after determining which best represented the constructs.

Employees and their managers were asked to respond to the survey based on employees' behaviors exhibited over the 3 months prior, rating each of the 65 items on a 5-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree." Any items with a negative valence were reverse coded so that higher scores were indicative of favorable performance-related behaviors. To determine the number of factors comprised in the original 65 performance items and to identify items that were poor factor indicators, we first ran an exploratory factor analysis (EFA). Using EFA, we estimated a 6 to 15 factor solution to help us determine the optimal number of factors as well as to remove the items that were highly correlated with other items, had low factor

loadings (<0.35) or that loaded on more than one factor. After several iterations, we found that an eight factor solution with 35 of the 65 items best fit the data (RMSEA = 0.04, RMSR = 0.03).

To create the eight performance-related behavior indicators, we computed the mean of the relevant items. The eight factors include: (1) shares ideas and information (4 items; eg, “I frequently share information and resources with other employees”); (2) teamwork (5 items; eg, “I cooperate with others in my team to get the job done”); (3) interpersonal skills (4 items; eg, “I always treat others at work with respect”); (4) commitment (4 items; eg, “I show pride when representing the organization in public”); (5) effort and time management (6 items; eg, “I need constant reminding to get my tasks done”); (6) dependability (5 items; eg, “I consistently produce high-quality work”); (7) adaptability (4 items; eg, “I always adapt quickly to new situations at work”); and (8) client relations (3 items; eg, “I place top priority on my customers at work”). The factors and each of their respective items are detailed in the Appendix. Using Cronbach’s α , the internal consistency (ie, how well the items within a particular performance indicator measure the same construct) of each of the eight performance indicators was 0.70 or higher.

Confirmatory factor analysis (CFA) was subsequently used to assess measurement invariance between reporters: whether the factor structure was consistent using both employee- and manager-reported performance. While we viewed this analysis as preliminary given our small sample size, the results revealed that the eight factor structure was appropriate using either employee- or manager-reported performance. Each of the 35 items was significantly, positively linked to its respective factor. Full results from the CFA are available from the authors upon request.

The survey also included several measures of global performance, job characteristics and basic background information. Employees and managers rated employees’ global performance along three dimensions each assessed on a 7-point scale including: (1) performance relative to what is expected, (2) performance relative to others employed in similar jobs and (3) overall performance. Using this information, we created a composite global performance index by computing the mean of the three items (Cronbach’s $\alpha = 0.82$). In addition to the global performance index, we also assessed employees’ and managers’ perceptions of the importance of various performance indicators to global performance. Respondents selected from a list of 11 the three aspects of performance they believed were most

important for a person’s performance at work.¹ Finally, to assess employees’ job complexity, we averaged six items examining the skill level required on the job, whether employees had to learn new things on the job, whether they have to problem solve and whether they have to multitask (Cronbach’s $\alpha = 0.67$). Each item was rated a 5-point Likert scale (1 = “strongly disagree” to 5 = “strongly agree”).

Table 1 displays the mean scores on the eight performance-related behavior indicators, the global performance index and job complexity by reporter type. On average, performance was quite high overall. The highest mean agreement was reported for employees’ interpersonal skills, and commitment the lowest. Several of the self-reported performance-related indicators were significantly higher than the line manager-reported indicators, notably dependability, effort and time management and interpersonal skills.

The organization shared with us their annual performance ratings, which gave us an assessment of employees’ overall performance independent from the survey. For this rating, each employee was rated by his/her manager on a 5-point scale from 1 = unacceptable performance to 5 = superior performance. Appraisal data were missing for 30 of the 140 employees (21%): 9 employees had only joined the organization in the past year and 21 employees had not received an annual rating. All reported performance-related behaviors and global performance scores were comparable across employees who had appraisal data and those who did not. On average, employees’ annual rating scores were 3.44 ($SD = 0.99$).

Sample

The participating organization is a private health insurer in the UK. The human resources department within the organization sent recruitment emails to approximately 200 employees working primarily in sales and customer services occupations. Willing employees gave permission to pass along their contact details and those of their direct line manager to one member of the project staff. Email messages with the link to the survey and personal identification numbers were sent to employees and their managers. All participating employees received a gift certificate of approximately \$30 in

¹This list of 11 was based on our initial literature review. Thus, there is not complete overlap between the eight performance indicators (which were determined by the data) and the 11 importance indicators, although the overall constructs captured by both were quite similar. The 11 importance indicators include: teamwork, interpersonal skills, commitment, effort and initiative, ability to complete tasks on time, dependability, ability to adapt to new situations, customer service, ability to learn from mistakes, attendance and compliance with organizational procedures and rules.

Table 1 Mean (standard deviation) performance-related behaviors, global performance and job complexity by reporter type

	Employees (n = 140)	Managers (n = 83)
Performance indicators		
Shares ideas and information	4.14 (0.52)	4.02 (0.49)
Teamwork	4.28 (0.42)	4.14 (0.56)*
Interpersonal skills	4.46 (0.45)	4.24 (0.60)**
Commitment	3.76 (0.74)	3.65 (0.64)
Effort and time management	4.43 (0.47)	4.13 (0.61)***
Dependability	4.42 (0.46)	4.08 (0.54)***
Adaptability	4.12 (0.46)	4.04 (0.50)
Client relations	4.30 (0.53)	4.15 (0.56)*
Global performance index	5.66 (0.81)	5.36 (1.04)*
Job complexity scale	3.77 (0.58)	3.91 (0.45)*

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; two-tailed test assessing differences in employee- and manager-reports.

value as an incentive. Of the 200 employees who initially signed up for the study, 140 (70%) completed the survey; survey data was also completed by 83 managers. Table 2 below provides sample characteristics for the employees.

As seen in Table 2, the average age of participants was 32 years, more than a third were male and the majority was White. One fifth had at least a Bachelor's degree and more than 60% had been in their posts for at least 2 years. Just over 60% worked in the customer services department in their organization with the remaining 40% in sales (17.1%), human resources (4.3%), IT (2.9%), medical (5.7%) or other departments (8.6%). By and large, employees worked a typical full-time workweek and more than half worked traditional day shifts.

Analytic strategy

We first examined the bivariate correlations between each of the eight performance-related behaviors and

the global performance index. Second, to determine the unique associations between each of the performance-related indicators and global performance (net of the other indicators) we ran a series of ordinary least squares (OLS) regression models in which global performance was regressed on each of the eight indicators. This initial model controlled for reporter type (employee or manager) as well as employees' department, gender, job tenure and average job complexity.

Using a method recommended by Horton and Fitzmaurice,¹⁹ subsequent models incorporated an interaction term between each of the eight performance indicators and the reporter indicator variable to assess whether the link between the performance indicators and global performance was moderated by reporter (eg, if the links were stronger or weaker depending on which type of report was used). We tested further interactions between the eight performance indicators and workers' reported job complexity. Interaction terms that did not reach standard levels of statistical significance were removed from the analytic model given the relatively small sample size.

Using Stata software, these analyses incorporated Hubert-White standard errors, which provide a more conservative test of statistical significance to account for clustering across employees in our data (ie, two surveys per employee).

Subsequently, we examined the associations between the performance-related behavior indicators and organization's annual performance ratings to assess the degree of compatibility between our performance assessment and the appraisal data collected by the organization. For these analyses, we aggregated the employee- and manager-reported performance-related behavior indicators across employees as we only had one annual rating per employee.

Table 2 Background and job characteristics of employees

	Employees (n = 140)
M(SD) Age	32.0 (8.5)
Gender (male)	37.1%
Ethnicity (White)	96.4%
Educational attainment (Bachelor's degree or higher)	20.0%
Department (customer services)	61.4%
Job tenure (2 years or more)	62.1%
M(SD) Working hours/week	35.6 (7.1)
Shift type (regular 9–5)	61.4%

Note: Table presents means with standard deviations in parentheses and percentages.

Finally, we examined which three aspects of performance-related behavior employees and their managers perceived as most important to overall performance. We contrast these reports with the results from the regression analyses.

Results

Links between the performance-related behavior indicators and global performance

Bivariate correlations between the eight performance-related behaviors and global performance were all statistically significant and positive in direction, although some were rather small; notably, the statistics for commitment and interpersonal skills were less than $r = 0.30$. The remaining correlation coefficients ranged from $r = 0.32$ for adaptability to $r = 0.59$ for dependability. The full bivariate correlation table is presented in Table 3.

Moving on to the multiple regression results where we were able to examine the unique links between each of the eight indicators and global performance controlling for some potentially confounding variables, we found two statistically significant associations (see Model 1, Table 4). Namely, sharing ideas and information and dependability were both positively associated with employees' global performance net of the other performance indicators and employees' background and job characteristics. The coefficient for reporter type was not significant suggesting that global performance was rated similarly by employees and their managers. Workers in customer services departments exhibited higher levels of global performance than their peers in other departments. This model accounted for about half of the variance in global performance.

Our next set of models incorporated interaction terms between each of the eight performance indicators and the reporter type indicator variable. None of these interaction terms reached statistical significance suggesting that the individual links between the indicators and overall

performance did not vary depending whether employee- or manager-reported performance was used. These interaction terms were excluded from further analyses.

Subsequently, we included interaction terms between job complexity and the eight performance indicators. Analyses revealed that job complexity moderated the link between sharing ideas and information and overall performance (see Model 2, Table 4). The impact of idea and information sharing on overall performance increased as levels of job complexity increased. Indeed, workers with high levels of job complexity and idea sharing exhibited the highest average overall performance; while workers in complex jobs with lower than average idea sharing had the lowest average overall performance (see Figure 1). Interestingly, a positive association between client relations behaviors and overall performance emerged in this final model.

The same pattern of findings was exhibited when the employee- and manager-report data were averaged together (ie, aggregated).

Links between the performance-related behavior indicators and annual performance ratings

Assessment of the bivariate correlations between the eight performance indicators and employees' annual performance ratings revealed that effort and time management and dependability were the only two indicators that were significantly associated with annual appraisal scores. Both statistics were $r = 0.23$.

When entered into a multiple regression model controlling for employees' department, gender, job tenure and job complexity, each of these associations attenuated to non-significance, with the exception of dependability, which remained moderately statistically significant ($B = 0.51$,

Table 3 Correlations among performance-related behaviors and global performance

	2	3	4	5	6	7	8	9
1. Shares ideas and information	0.51	0.41	0.25	0.36	0.47	0.37	.43	.47
2. Teamwork		0.67	0.33	0.50	0.54	0.46	.51	.43
3. Interpersonal skills			0.29	0.51	0.48	0.51	.41	.29
4. Commitment				0.32	0.22	0.19	.25	.20
5. Effort and time management					0.57	0.38	.48	.43
6. Dependability						0.45	.46	.59
7. Adaptability							.34	.39
8. Client relations								.33
9. Global performance								

Note: All r 's significant at $p < 0.05$ or less; $N = 223$.

Table 4 Unstandardized regression coefficients with robust standard errors (in parenthesis) for associations between performance-related behaviors and global performance

	Model 1	Model 2
Shares ideas and information	0.33 (0.12)**	−1.48 (0.65)*
Teamwork	0.25 (0.18)	0.21 (0.17)
Interpersonal skills	−0.21 (0.17)	−0.22 (0.16)
Commitment	0.00 (0.07)	0.01 (0.07)
Effort and time management	0.19 (0.13)	0.18 (0.12)
Dependability	0.62 (0.15)***	0.65 (0.15)***
Adaptability	0.10 (0.12)	0.06 (0.12)
Client relations	0.16 (0.10)	0.23 (0.10)*
Rater (employee)	−0.01 (0.11)	−0.02 (0.11)
Department (customer services)	0.10 (0.03)***	0.09 (0.02)***
Gender (male)	−0.12 (0.11)	−0.12 (0.10)
Job tenure (2 years or more)	0.16 (0.10)+	0.19 (0.10)+
Job complexity	−0.14 (0.11)	−2.04 (0.69)**
Shares ideas *job complexity	–	0.47 (0.17)**
R ²	0.47	0.49

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; two-tailed test; $N = 223$.

$SE = 0.28$; $p = 0.07$). Workers who had been in the job longer also received higher annual performance ratings than their colleagues who were relatively new to the organization ($B = 0.39$, $SE = 0.20$; $p = 0.05$). Dependability was a more important predictor of annual performance ratings for workers with higher than lower job complexity scores (see Figure 2). These models accounted for less than 20% of the variability

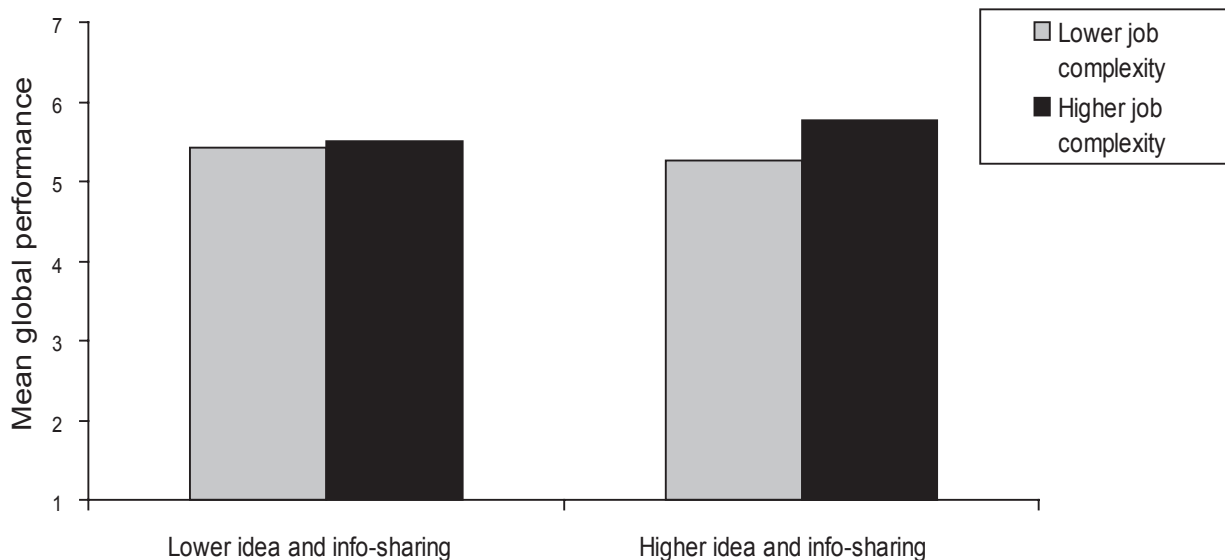
in the outcome, however, suggesting that relative to the employee- and manager-reported global performance index, the annual performance rating captured other aspects of performance or work-related factors that were not assessed in the present study. Dependability and, to a lesser extent, effort and time management – two assessments of employees' ability to complete their work to task and to time – appear to be the primary predictors of the annual ratings.

The association between the global performance indicator and annual performance ratings was $r = 0.28$, which was statistically significant.

Perceptions of importance of performance indicators

All participants indicated the three aspects of performance (from a list of 11) they believed were most important for employees to do well in their jobs. Table 5 displays the percentage of employees and managers that perceived each of the 11 indicators to be important. By and large, employees and managers reported similar importance ratings with three exceptions. Managers ranked behaviors related to interpersonal competence and dependability higher than employees. Yet, more employees than managers perceived compliance with rules and procedures as a necessary behavior.

On the whole, teamwork, customer service and effort and initiative were the top ranked performance-related behaviors, and for managers, dependability was also considered important. Looking back on the regression findings, we see a relatively high

**Figure 1** Interaction between shares ideas and information and job complexity for global performance.

Notes: Figure presents means adjusted for the remaining seven performance-related behaviors, rater, department, gender and job tenure. For the purposes of this figure, both variables were dichotomized such that "lower" scores were coded as less than 4 and "higher" scores, 4 or greater; $N = 223$.

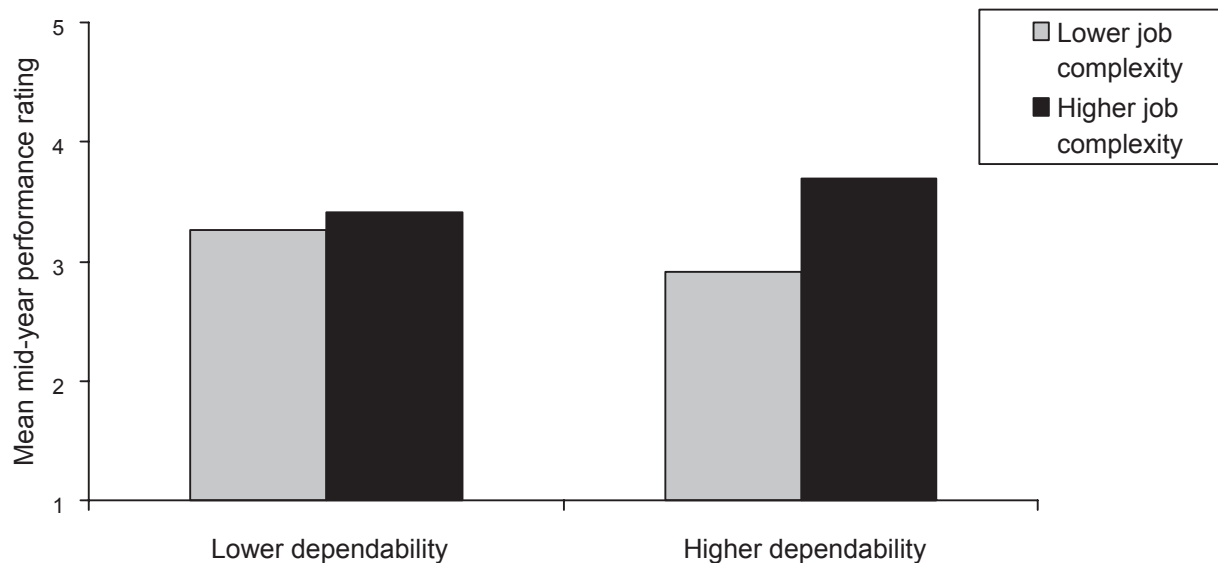


Figure 2 Interaction between dependability and job complexity for annual performance ratings.

Notes: Figure presents means adjusted for the remaining seven performance-related behaviors, rater, department, gender and job tenure. For the purposes of this figure, both variables were dichotomized such that “lower” scores were coded as less than 4 and “higher” scores, 4 or greater; $N = 110$.

degree of compatibility between reality and perceptions: the performance-related indicators that predicted global performance and those that were ranked as most important. Sharing ideas and information, a teamwork-related behavior, dependability and client relations were the strongest predictors of reported global performance. Dependability and effort and time management were moderately linked to annual performance ratings. By and large, employees and managers seem to be tuned into the key behaviors that were driving overall performance.

Discussion

The present study aimed to build on the rather limited empirical research exploring the nature of work and employee

performance in the knowledge economy. Using data from a pilot study of a multi-rater performance assessment, we aimed to examine which performance-related behaviors were the key drivers of employee’s global performance as well as whether these associations were robust regardless of whether employees or managers were assessing performance. Exploratory in nature, our study focused on one knowledge-intensive services organization in the UK. In particular, we examined several important features of employee performance, focusing on both task-related and extra role behaviors, and how these features impacted employees’ overall performance ratings. We also explored whether these links varied depending on the level of complexity present in

Table 5 Perceptions of importance of performance-related behaviors by reporter type (percent agreement that indicator is important)

	Employees ($n = 140$)	Managers ($n = 83$)	Total ($n = 223$)
Teamwork	63.6%	67.5%	65.0%
Interpersonal competence	12.1%	34.9%	20.6%***
Commitment	11.4%	10.8%	11.2%
Effort and initiative	47.1%	37.3%	43.5%
Ability to complete tasks on time	22.1%	22.9%	22.4%
Dependability	20.0%	39.8%	27.4%***
Ability to adapt to new situations	19.3%	25.3%	21.5%
Customer service	54.3%	51.8%	53.4%
Ability to learn from mistakes	24.3%	21.7%	23.3%
Attendance	11.4%	13.3%	12.1%
Compliance with organizational rules and procedures	22.9%	3.6%	15.7%***

Notes: *** $p < 0.001$; two-tailed test assessing differences in employee- and manager-reports.

employees' jobs. We review some of the notable findings, discuss the limitations of this research and comment on implications below.

Our analyses revealed few differences between employees' and their managers' ratings, both in terms of their respective employee performance scores as well as which specific performance-related behaviors most strongly mapped on to overall performance. Employees and managers seem equally attuned to what is most important for the organization. These findings are contrary to older studies which implied that employees were too lenient when applying ratings to their own behavior.^{17,18} Further research with larger sample sizes and a more diverse group of organizations would help to gauge the true differences in employees' and managers' ratings. Even if overall differences between different raters are slight, internal employee appraisal systems increasingly encompass "360 degree" ratings, whereby employees, managers, peers and even subordinates assess employee behavior.^{11,20,21} It is likely that these assessments provide useful information to employees when their behavior is judged from these rather different perspectives.

The common perception across our sample was that behaviors related to teamwork and customer services were the most important ingredients for high performance. These are the very types of behavior hypothesized to be ever more important in the knowledge economy as firms become increasingly dependent on intangibles and human capital inputs rather than natural resources and physical labor. Employees' abilities to share information, communicate effectively and collaborate with others are some of the key tasks that define work in knowledge-intensive industries today.¹⁴ Validating these perceptions, we found that dependability, sharing ideas and information and client relations – a mixture of task and contextual performance indicators – were the strongest predictors of global performance according to both employees and their managers. On the other hand, when employee's annual performance ratings were regressed on the performance-related behaviors, dependability and time management behaviors were the primary predictors; behaviors related to teamwork or customer relations were not significantly related to the appraisal data. Given the generally weak associations between our performance assessment and the organization's annual rating scores, it is not clear which key behaviors the appraisal is capturing and how employees can improve upon the necessary behaviors.

Our findings also revealed that behaviors related to sharing ideas and information were more strongly related to global performance for employees in complex jobs,

defined by high levels of skill, ongoing learning, multitasking and problem solving, relative to workers who reported less complexity in their roles. Innovation and creativity are increasingly believed to be the keys to organizational success and our findings suggest that responsibility for idea generation and related behaviors falls on certain workers over others. Results from a recent survey of workers in the knowledge economy indicated that, on average, workers use a fairly limited range of methods to share and capture information in the workplace, focusing primarily on informal interactions with colleagues. Idea-sharing tactics that were less common included talking to outside experts, reading professional journals, attending external training sessions or events, scheduling brainstorming meetings and using informal socialization outside of the office.¹⁴ The results from this survey found a positive relationship between job complexity and the number and range of tactics used. Clearly more research and understanding is needed regarding how information and knowledge, particularly tacit knowledge, can better be captured and shared among workers of all levels in the knowledge economy.²²

Dependability—the degree to which employees can be relied on to complete tasks to time and to a high-quality—remains a crucial aspect of employee performance. Whether using employee- or manager-reported assessments, survey responses or appraisal data, dependability appeared to be one of the keys to organizational success. Indeed, using the annual performance ratings, dependability was the only performance-related behavior that was reliably linked to rating scores and this association was primarily true for workers in more complex jobs. Interestingly, some follow-up analyses revealed that employees who tended to work non-traditional shifts had lower dependability scores relative to their 9 to 5 counterparts, particularly when managers' ratings were used. Although we cannot tease out the reasons for these lower ratings, there are some potential implications for workplace flexibility. As more and more organizations accommodate more flexible working schedules including home working, part-time work and choice over working times, they may need to find new ways to capture the behaviors related to dependability.

Although the present study shed some new light on the key aspects of employee performance in the knowledge economy, there are several gaps remaining. The correlations observed between the eight performance-related behaviors were quite moderate, suggesting that they are not entirely independent. Thus, while we were able to tease out the key predictors of employees' global performance, it is

likely that each of the eight indicators as well as the overlaps between them captured some of the variability in the outcome variable. It is quite difficult to entirely separate the various behaviors as favorable performance in one dimension likely influences performance in the others. Similarly, it would have been useful to obtain more than just employees' and managers' assessments of performance. We attempted to capture peer-reports, but found that organizations generally found this additional data collection somewhat intrusive and thus not feasible from a research perspective. To some extent this problem could be resolved if a large enough sample of employees was made available to each participant to complete only one survey (ie, a self-report or a manager-report or a peer-report). Obtaining large samples is a difficulty in organizational research.

Perhaps most importantly, our study was exploratory in nature focusing on one knowledge-intensive services organization in the UK. To better quantify the impacts of the knowledge economy on employee performance, a larger sample of organizations with varying degrees of knowledge intensity is necessary. Further, if a large enough sample of organizations and employees was obtained, we would be able to conduct multi-level (ie, organizational- and employee-level) analyses where we could examine how employee performance varies between organizations (on aggregate) and between different employees working within the same organization. These types of models allow the analyst to predict performance using both organizational and individual predictor variables and to identify which level of variable accounts for most of the outcome variance. Indeed, these data are increasingly becoming the gold standard in contextual research, albeit quite costly and time consuming to conduct.

On a more macro level, our study did not attempt to link the performance indicators to overall organizational or departmental productivity. Thus, we know little about how and to what extent the various performance-related behaviors link to larger-scale indicators of productivity. While most experts would not claim that the knowledge economy has contributed to a radical shift in the nature of work and thus a huge leap in the UK productivity figures, more research is needed to try to map and link the features of organizations that directly contribute to productivity. Qualitative research including in-depth interviews would be useful in elucidating this information, especially since robust research on the knowledge economy remains rare.

Future research is needed to examine further the applicability of general performance assessments in knowledge-intensive firms as well as how findings may vary

for different types of workers. A predominantly service-based economy has fewer tangible assets than its industrialized counterparts and the wealth that is generated is almost completely reliant upon the human capital of employees. It has therefore become an imperative to ensure that this human factor is optimized in order to meet business demands. As organizational success increasingly is dependent on intangible inputs stemming from the ideas, innovations and creativity of its workforce, performance assessments may need to be updated to reflect these new skill sets and behaviors. Dependability, time management and effort will remain important employee behaviors, but organizations need to ensure that they are capturing the other behaviors that help to define their success.

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Appendix

Performance-related behavior factors

Shares ideas and info	Team-work	Interpersonal skills	Committed	Effort and time management	Dependability	Adaptability	Client relations
I always can be counted on to help other employees with their work when they have been absent	I have solid working relationships with others in my team	I always treat other people at work with respect	I promote the organization to outsiders	I never take undeserved work breaks	I always get my work done according to deadlines	I am frequently overwhelmed by complex tasks at work	I place top priority on my customers at work
I frequently share information and resources with other employees	I work well with other teams	I get along easily with others at work	I defend the organization when other employees criticise it	I spend a great deal of work time engaging in personal phone or email conversations or internet surfing	I can be counted on by others to do my job	I learn new work-related skills quickly	I am always trying to improve customer satisfaction in my work
I offer ideas to improve the functioning of the organization	I usually support team decisions	I always make an effort to get along with my co-workers	I show pride when representing the organization in public	I do not take unnecessary time off of work	I always prioritize tasks and activities to ensure that my goals are met	I always adapt quickly to new situations at work	I am successful at identifying the needs of current and potential customers
I come up with new ideas at work	I sacrifice my personal preferences for the good of the team	I have difficulty working with people who have different backgrounds and personalities than me	I express loyalty towards the organization	I frequently arrive at work late or leave work early	I comply with instructions even when my line manager/supervisor is not around	I am able to cope with setbacks and disappointments at work	
	I cooperate with others in my team to get the job done			I never put more effort into my work than I have to I need constant reminding to get my tasks done	I consistently produce high-quality work		