Abstract

We seek a simple model of job characteristics and leadership for workers in a digitalized work place, where self-management is increasingly required as more work is done through enterprise digital and social media rather than face-to-face interaction. We look to work location, supervisor communication, feedback from the work itself, technology support, and work-related knowledge as precursors to work engagement. Here, we assess some of the basics of work design and management for employees across a range of work strategies as part of a larger study on flexible work and work-life balance in metropolitan areas. We find the strongest relationship with work engagement to come from feedback from the work itself and the knowledge to work independently. Supervisor communication also plays a role in work engagement, but location is surprisingly of little importance. We discuss the generalizability of these results and how future research can consider location in greater depth.

1. Introduction

Oldham and Hackman [1] provide a retrospective on their job design work and speculate on the future.

It is true that many specific, well-defined jobs continue to exist in contemporary organizations. But we presently are in the midst of what we believe are fundamental changes in the relationships among people, the work they do, and the organizations for which they do it (p. 466).

They describe telecommuting, fluid job responsibilities, and independent contractors with simultaneous jobs of varying duration. Responsibility for engagement, motivation, and direction toward a goal is shifting to include all workers, not just professional managers. As work becomes more virtual, distributed, and flexible [2-6], through the use of enterprise social media and other tools, we have an opportunity to rethink work design as something carried out every day by everyone.

We seek a simple model of job characteristics and leadership that can be applied by the general work population. We look to work location, supervisor communication, feedback from the work itself, technology support, and work-related knowledge as precursors to work engagement. Here, we assess some of the basics of work design and management for employees across a range of work strategies as part of a larger study on flexible work and work-life balance in metropolitan areas. Traditional work at the office, working from home, and a variety of hybrid approaches, including working at other organizations or public sites, are part of these employees’ environment.

Our results show the value of supervisor communication and work design that focus on the development of knowledge through feedback from the work and technology tools, but interestingly, not through where one works. While we understand the difficulty of drawing conclusions from a non-significant finding, we think it is an interesting issue as more fluid work environments increase in popularity.

2. Substitutes for leadership

Research on substitutes for leadership is foundational to our perspective. Kerr and Jermier’s introduction of substitutes for leadership [7] tried to untangle the dynamics of organizational leadership by examining substitutes and neutralizers of leadership behaviors. They offer that characteristics of the subordinate (e.g., ability), the task (e.g., feedback), and organization (e.g., cohesive work groups, spatial distance) can substitute for some basic leadership behaviors (e.g., initiating structure and consideration).

[While a full review of the substitutes for leadership literature is beyond our scope, interesting reviews and perspectives are available e.g., 8, 9, 10]. Organizational routines serve a similar purpose, removing the need to debate and negotiate many common and frequent
activities, thus creating an “organizational truce” that allows organizational members to move forward without specific leadership directives (even though these routines may not always work well, or may diverge from broader goals or procedures) [11-13].

Jermier and Kerr’s [8] observation that, “[F]ormal leaders do attempt to control the organization, but they do so by making decisions that minimize the need for the face-to-face exercise of power” is prescient of leadership needs today as more work is done away from supervisors or colleagues. However, in their 1997 assessment, Jermier notes that little work had addressed how substitutes have their effects, how substitutes are created, what leadership changes result from substitutes [offering 14 as an example], and how substitutes differ by type of organization or person. While the substitutes for leadership research has found mixed support [see 9 for a fantastic exchange of theoretical letters on the topic], it may be an area whose time has come, given greater integration of technology into work, and greater distribution of work across time, locations, and people. What was invisible may now become clearer as our workplace is often a computer (or smartphone or tablet) screen, and a voice connection, with all their related documentation, linkages, and programs.

Following from Kerr and Jermier’s work [7], we focus on the main effects of substitutes/complements for leadership, rather than the possible moderation of hierarchical leadership by different listed substitutes. This focus on main effects is also supported by Podsakoff, MacKenzie, and Bommer’s [15] meta-analysis, which found little support for moderated relationships. Jermier and Kerr [8] highlight the importance of individual, group, task, and organizational processes beyond the effects of formal, interpersonal leadership.

Instead, the focus includes technological, structural, and other “impersonal processes” [8, p. 98] that leaders or subordinates use and create to support their work. We agree with their notion that formal leaders do attempt to control what happens in the work, but that they do so through both structural and interpersonal means. We additionally agree with Jermier and Kerr [8] that some workers do not need structuring or emotional support from leadership, as they may provide it internally, find it in routines, and/or acquire it from other workers.

Whereas formal leadership might be tasked in traditional environments to create an environment of motivation, opportunity, and ability [16, 17], in modern environments these requirements may fall on the individual worker (or team -- but our focus here is on the individual). Given the growth of work outside and across traditional organizational walls, we see value in stepping back and addressing management foundations as they may become more important to individuals as they manage themselves. This approach results in the model presented in Figure 1, using four substitutes for leadership: Knowledge to work independently, feedback from the work itself, technology support, and alternative workplace use.

![Figure 1. Conceptual model](image)

### 3. Knowledge to work independently

Knowledge to be able to work independently (to distinguish from knowledge that might have come directly from a supervisor) is hypothesized to be the result of feedback from the work itself, technology support, and the broader environment -- here, alternative workplace use. Prior education, organizational assimilation, and training are also key antecedents, but left for future research.

#### 3.1 Feedback from the work itself

Feedback from the task environment is a basic component of human factors engineering [18] and job enrichment [19]. Feedback can provide both directional and motivational support. Ilgen, Fisher, and Taylor [20] offer that directional feedback supports what needs to be done and thus knowledge to do the work independently, while motivational feedback will have more direct effects on work outcomes -- in this case, work engagement. Here, we acknowledge the opportunity for feedback from the work itself to affect the development of independent work knowledge (Hypothesis 1), as well as to provide motivational support that can lead to greater work engagement (Hypothesis 4).

_Hypothesis 1: Feedback from the work itself is positively related to independent work knowledge._

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3.2 Technology support

Use of knowledge management systems can provide knowledge to work independently of interpersonal supervision by changing flows of knowledge transfer [21]. Additionally, Ilgen, Fisher, and Taylor’s [20] discussion of feedback, building on the work of Annett [22] and Bilodeau [23], describes feedback from observers (other workers/supervisors), the task, and self-feedback. In the category of task feedback, they note the value of augmented feedback (e.g., auditory feedback added to a visual tracking task). Augmented feedback is noted as an option whenever feedback from the task/work itself is not sufficient. In contemporary organizations, especially with temporal and spatial dispersion of work, augmented feedback is necessary and extensively available through the general technological support of work [24]. Technology serves to augment feedback from the work itself, thus adding to feedback from the work itself to aid in development of knowledge necessary to work independently.

Hypothesis 2: Technology support is positively related to independent work knowledge.

3.3 Alternative workplace use

Today’s flexible work environments are increasingly dispersed over space and time and defined by workers, due to individual work preferences, organizational policies, and task requirements. Hence, research on virtual teams provides useful background on how modern work styles may affect the development of knowledge useful for self-management. Gibson, Gibbs, Stanko, Tesluk, and Cohen [25, for example, specifically addressed issues of classic job design, e.g., 19] in more virtual settings. They argued from a variety of studies that working away from the traditional office decreases the likelihood of useful interpersonal feedback loops [26], increases time between feedback [27], and reduces the likelihood of workers asking follow-up questions [28] - all pointing towards alternative work locations as dampening the flow of knowledge related to independent work. In their field work with 177 workers across industries, interpersonal feedback is positively related to knowledge of results only when face-to-face communication was high. In cases where there was a dependence on electronic communication, feedback did not have a significant relationship with knowledge of results.

Cramton [29] also argues that working physically separate from other members of the team can lead to reduced common ground -- mutual knowledge that collaborators share, again signaling that working away from others may limit knowledge gained about doing the work. Cramton suggests that there can be failures of information exchange, noting that communication across distance and technology can be a “leaky process” (p. 364). Cramton also suggests that there can be interpretation errors if dispersed teams have difficulty in understanding the salience of information, the background from which it is derived, or reasons behind what might appear as “silence” or excessive delays. Thus, while all employees may have access to knowledge management systems, working at the office may provide additional avenues to ground that knowledge or provide knowledge not in the system.

Hypothesis 3: Amount of work done away from the traditional office is negatively related to independent work knowledge.

4. Work engagement

Past research indicates that work engagement is an important predictor of performance, either directly or by mediating behavior [e.g., 30, 31, 32]. The contemporary work environment, facilitated by increasingly pervasive technology, as noted earlier, can allow/require organizational members to work in flexible, such as spatially and temporally dispersed, ways. In these work contexts, work engagement would seem to be an even more important predictor of performance, because of less direct supervision and more distanced interactions, requiring greater self-direction and motivation.

Moreover, Hoch and Kozlowski [33] found in a field sample of 101 teams that the more virtual the team, the more structural supports (rewards and communication) and shared team leadership were related to performance; additionally, the more virtual the team, the more the role of hierarchical leadership decreased. Given our focus on basic main effects, we leave aside for now the moderating role of work location. Instead, we look at the direct role of feedback from the work itself, the individually held knowledge that enables independent work, and supervisor communication (contending that communication is a key way interpersonal leadership would be transmitted) as influences on work engagement -- the role of alternative workplace use being modeled through knowledge for independent work, as noted below.

4.1. Feedback from the work itself

Schaufeli and Bakker [34] found a positive relationship between job resources such as performance feedback, social support, and supervisory
coaching, with work engagement. Others note that immediacy in feedback supports engagement [e.g., 35] as it is a motivational interaction. However, we also acknowledge that in a work environment characterized by independent workers, the effect of such job resources could be mediated by, or instantiated in, the knowledge to work independently (i.e., as knowledge becomes tacit through experience [e.g., 36]), and so also offer H5 below.

Hypothesis 4: Feedback from the work itself is positively related to work engagement.

4.2. Knowledge to work independently

Kerr and Jermier [7] include ability, experience, training and knowledge in their original substitutes for leadership scale. Interestingly, they do not provide the background logic for this dimension (p. 378). Our take is that this dimension was foundational -- if a worker has the knowledge to do the work independently of the supervisor, by definition it is a substitute for leadership and should directly affect work engagement.

We can provide underlying support from the perspective of self-leadership. In their meta-analytic review [37], Stewart, Courtright, and Manz describe control loops where people perceive a situation, choose a behavior, monitor the outcomes, and evaluate for improvement. Manz [38], in his article introducing self-leadership, offers that it is, “a comprehensive self-influence perspective that concerns leading oneself toward performance of naturally motivating tasks as well as managing oneself to do work that must be done but is not naturally motivating” (p. 589). The results from the meta-analysis [37], including a 30-person field-study [39], show that self-leadership is positively related to self-efficacy and performance. To some extent, this individual-level self-leadership is similar to the organizational level learning discussed in knowledge management research [40, 41].

Hypothesis 5: Independent work knowledge is positively related to work engagement.

4.3. Supervisor communication

We do not argue that substitutes for leadership completely replace supervisor interpersonal interaction. Stewart, Courtright, and Manz [37], for example, note that “external leadership in the forms of empowering leadership and shared leadership facilitate self-leadership of individuals and teams” (p. 185). While they state this as a moderating effect, we focus here on a simple main effect. Leadership influence is often described in behavioral terms [see 42, for a recent version]. Higher levels of communication typically predict positive work outcomes [43, 44], yet lowered communication frequency is an often noted limitation of virtual work [45]. However, in some cases supervisory communication reduced through telework/flexwork can be beneficial, 46]. We model supervisor communication as a direct effect to the extent that greater communication provides greater opportunity for leadership influence both in terms of motivation and direction of the work.

Hypothesis 6: Supervisor communication is positively related to work engagement.

Note that we do not model supervisor communication as leading to independent work knowledge, because independent work knowledge is by definition knowledge to work separate from the supervisor. More communication with supervisor might be a way to develop that knowledge, but also might get in the way of developing such knowledge personally. Supervisor communication is certainly related to work knowledge in general, as well as to work engagement, but that is not the focus of this particular research.

5. Data and methods

5.1. Sample and procedure

The data were collected in the spring of 2013 in a large Nordic telecommunication company. The company employs over 25,000 employees worldwide and has 1538 workers in the Finnish headquarters where the data was collected. This site works in close collaboration with other Finnish sites as well as with other Nordic locations. Hence, the majority of the workers in the company had some experience working from dispersed sites. In addition, the company had a long history of using flexible work practices. In their formal flexible work guidelines they define flexible work as “work in which the working time and place can be selected individually.”

The survey was sent to all members of the national headquarters. From this sample, 830 usable responses were received, resulting in a 54% response rate (57% male). Most of the respondents worked full-time (99%) and had a standard employment contract (97%). The modal age of respondents was 41-50 years old and the average organizational tenure was 17 years (sd=9.6). We assessed age and gender (age and tenure are highly correlated) as covariates and while there was a gender effect, it did not change the pattern of results for the hypothesized relationships.

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5.2. Measures

5.2.1 Knowledge to work independently, feedback from work, and technology support. While Kerr and Jermier offered a set of scales related to the underlying components of substitutes for leadership, Podsakoff, Niehoff, MacKenzie, and Williams [47] provided a set of enhanced scales and Podsakoff and MacKenzie [48] then presented a further refinement. As per past research [e.g., 10, 49], we used only those scales most related to our specific field context to keep the survey manageable for the organization, and in some cases simplified them still further given our need for translation into Finnish (the idea being for future research that simpler items are more veridically translated into multiple languages). We worked with Podsakoff and MacKenzie’s [48] ability, experience, training, and knowledge scale, creating our three-item scale of knowledge to work independently. We used their task provided feedback concerning accomplishment scale to create our three-item feedback from work scale. Finally, we added a three-item technology support scale based on the style of the Podsakoff and MacKenzie [48] scales. (Survey items are available from the authors.)

5.2.2 Alternative workplace use. We developed a large set of flexwork items following discussions with the organization. For this research we used the items focused on sustained work times (e.g., home, other company’s location, library), excluding more transient or idiosyncratic places (e.g., taxi, cafeteria, or summer cottage). The items were recoded to depict total days using 225 possible workdays in Finland [50]. We then added all days across the five locations and divided by 225 to get a formative measure of alternative workplace use that could range from zero to five.

5.2.3 Supervisor communication. The formative supervisor communication scale included face-to-face, text messaging, phone, and email communication. This scale was recoded to depict 225 workdays in Finland, then summed across the four forms of communication and divided by 225 to get a metric of supervisor communication that could range from zero to four.

5.2.4 Work engagement. We measured work engagement, using Schaufeli, Bakker, and Salanova’s [51] shortened 9-item scale. Schaufeli, et al. describe work engagement as a persistent and pervasive affective-cognitive state including work focused vigor, dedication, and absorption. (We drop one item from their Vigor subscale, “When I get up in the morning, I feel like going to work,” given the context of this research.)

6. Results

6.1. Descriptives and scales

Table 1 reports means, standard deviations, correlations, and where appropriate, Cronbach’s alpha for scale reliabilities, and item loadings.

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* n = 830. Where relevant, coefficient alpha reliability estimates are in parentheses.

**Where relevant, item loadings from CFA are included (i.e., not included for formative measures)

*p < .05, **p < .01

All scales had reliabilities greater than 0.8, well above the general standard of 0.7 and all items loaded significantly (p < .01) on their assigned latent factors (using STATA 13.1). We reduced the number of indicators on the work engagement scale from eight to three by combining the items into Schaufeli et al.’s [51] subscales (vigor, dedication, absorption).

6.2. Model fits

Figure 2 depicts the results for the hypothesized structural paths and the related fit indices ($\chi^2$[149, n = 786] = 445.91 < .00, RMSEA = .05, SRMR = .08, CFI = .95, TLI = .95). The model provides a good fit to the data using conventional standards of RMSEA ≤ .06, SRMSR ≤ .08, TLI ≥ .95, and CFI ≥ .95 [52, 53].
The telework, virtual teams and flexible work literature [e.g., 2, 29, 54] often suggests a cost of reduced communication, such as with one's supervisor, in virtual environments. We therefore modeled the alternative workplace use as a predictor of supervisor communication. This model was a statistically significant improvement over the original model ($\chi^2 \[1\] = 4.14, p < .04), ($\chi^2 \[148, n = 786\] = 441.77 < .00, RMSEA = .05, SRMR = .08, CFI = .95, TLI = .95), although the coefficient for the alternative workplace/supervisor communication link is not significantly different from zero (4.65, $z = 1.30, p < .20$).

7. Discussion

While earlier considerations of leadership and performance argued that spatial and temporal distance would reduce supervisory leadership and communication, and in fact were a key argument for the value of substitutes for leadership [e.g., 7], times may have changed. The results here were as hypothesized, except for the role of workplace location. We went into this project assuming that individuals who spent more days at alternative workplaces would be less likely to develop job related knowledge that let them work independently (Hypothesis 4). Not only was workplace not related to knowledge to work independently, but when we modeled alternative workplace use as a predictor of supervisor communication, we found no effect.

While we have tried to focus on basics (more foundational studies) for the job design aspects of this research, we have also tried to attend to more modern virtual work research. Our thinking paralleled that of Oldham and Hackman [1], in that the specific issues have changed, but not necessarily the phenomenon. We wanted to go back to basics around the issues of work design, but use the most recent research related to alternative workplaces and enterprise digital and social media to acknowledge that some virtual work effects may be transient as people grow in their experience.

The positive change in the overall model when alternative workplace use is modeled as a predictor of supervisor communication is reminiscent of work by Walther [55, 56], where, given time, computer-mediated communication could result in relationships as deep as those developed face-to-face. It may be that the challenge of working away from the formal office setting triggers changes in communication style. Workers and/or their supervisors acknowledge the human challenges and take specific steps (e.g., increasing communication) in response [e.g., 5]. This is similar to a Microsoft case where, when a China/U.S. virtual team was formed to work on Excel for the Mac, a “one team, many places” approach was taken with increased travel, communication, and support -- all resulting in a successful outcome [57]. While use of alternate workplace did not have an effect in our study, this may differ in completely virtual teams or in settings new to more flexible work.

The other elements of our model are clearly consistent with the theoretical development. Hypotheses 1 and 4 were supported showing that feedback from the work itself is positively related to both knowledge and work engagement. Technology (Hypothesis 2) positively supports that knowledge to work independently.

7.1. Limitations

The current study is not without limitations. First, the current data is cross-sectional, making it impossible to draw causal relations. This data comes from a larger ongoing study, where future data collection will allow longitudinal tests, as well as linking cross-sectional survey data to organizational performance. Another limitation of the data set is the individual level of analysis, making it hard to evaluate whether some of the results could be due to a sample consisting of highly independent workers. However, on the basis of pre-study discussions with HR personnel, it was stated that the majority of workers belonged to workgroups, and were dependent on other workers if not daily at least on a weekly basis. Thus another limitation is that we cannot control for team/group differences.

In the current study we are moreover drawing implications from work engagement rather than the more distal outcome of performance. We assume that increased work engagement results in elevated performance [e.g., 30, 31, 32]. Due to the fact that self-rated measurement of performance commonly is held as an unreliable method, we chose to study work engagement, which can and in fact needs to be, evaluated by the worker. Future research should use
actual objective work output performance measures wherever the work tasks allow, or subjective performance measures rated by a supervisor or independent party.

7.2. Future research

Future research should look at the role of leaders and subordinates in terms of who instigates the move from office work to alternative workspaces. In the Microsoft case, the leader was the trigger for these specific changes. In Majchrzak, et al. [5], the triggers came from across a range of individual, organizational, and technical sources. Thomas and Bostrom [58] have looked at what triggers virtual team leaders to make adjustments in their management. Additionally, research should investigate who initiates worker-supervisor communication in alternative workspace use. Are more extensive virtual supervisor communications built into the alternative workplace design? Do workers using alternative workplaces feel a greater need to communicate with their supervisors, or do the supervisors feel greater need to check up and/or monitor worker activity through more frequent communications?

Our research showed a significant relationship between technology support and knowledge to work independently. Drilling deeper into the form that such technology support takes would help elucidate this link. Our measure of technology support included building knowledge, getting knowledge when in doubt, and building motivation, presumably by monitoring results or engaging in the task. These items did not specifically exclude technology-enabled communication with the supervisor around those topics so we also suggest that the technology support scale be adapted to create this exclusion to avoid any possible confounding of the technology and communication effect. Instead the technology support items should specifically focus on technology support related to the work itself.

Additionally, antecedents to knowledge to work independently, such as prior education, organizational assimilation, and training, could be included as control variables.

Our surprising result, that work location (through flexible, temporally, or spatially dispersed work) did not have any effect on knowledge to work independently, may indicate an increasing sophistication amongst workers. That is, workers and/or their supervisors are coming to understand that effective work is designed across human, organizational, and technological dimensions and boundaries and not just related to supervisor and location. As we shift to modern work environments, work design must shift as well. Gibson et al. [25], for example, note that the effects of electronic communication dependence and of physical location are subtle and need to be considered separately.

Future research may find additional support in the area of job crafting, defined by Wrzesniewski and Dutton [59] as “the physical and cognitive changes individuals make in the task or relational boundaries of their work” (p. 179). This is a clear avenue to respond to Oldham and Hackman’s [1] questions around the properties of what makes up one’s job. Here, we shift to a broader discussion of work, to loosen the expectation that work takes place with traditional and clear boundaries around task and job. Alternative workplaces, enterprise social media technology use, and supervisor communication media are all aspects of job crafting.

Additionally, as more work is done through information and communication technologies, we may be able to design research that does a better job of parsing leadership, self-leadership, motivation, and supervision supported by technology. While research on the efficacy of substitutes for leadership is mixed [15], technology may be the reason. From the 70s to the 90s when most of this research was done, we tended to be co-located with our leaders and we had smaller portions of our work being mediated. Interpersonal leadership was easier and the technology tools to support alternatives were harder to come by. The need and power of substitutes may have been lost in that environment. The environment is very different now and so the benefits of leadership substitutes may be more apparent.

8. Conclusion

More work is done away from a traditional office. Much of our research has focused on how to make up for this shift, but perhaps that effort could be better spent on increasing available knowledge to work independently, via work that provides its own feedback, and through technology tools that support self-management. Supervisor communication is beneficial, but does not need to be face-to-face. Many freelancers have developed their own work and management practices [60]. While the freelance economy is growing [61], how much better could they (we) do if we went back to management basics and offered clear directions for self-management?

More broadly, our results offer a framework to think about work design, self-leadership, and substitutes for leadership, in the increasingly virtual, flexible, distributed, cross-organizational or non-organizational workplace. We can support workers and
leaders by highlighting the importance of practices that provide directional and motivational feedback from the work itself, and the development of knowledge to work independently through such feedback and organizational communication technologies.

9. References


