



# The moderating role of internal and external resources on the performance effect of multitasking: Evidence from the R&D performance of surgeons

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## ABSTRACT

R&D employees frequently must split their limited time between explorative R&D and exploitative operative tasks. This article explores the influence of this multitasking (pursuing both R&D and operations) on employee R&D performance. The article also analyzes how the relationship between multitasking and individual R&D performance interacts with the degree of access to internal and external resources. We hypothesize that multitasking positively affects R&D performance. Furthermore, we assume that the internal resources (funding, facilities, and support) are increasingly relevant when employees combine R&D and operative activities. However, multitasking employees may show less of a need for external resources (access to networks) in comparison to more focused colleagues. The results of a survey of 332 surgeons from 20 academic medical centers in Germany support our hypotheses. We conclude that managers should ensure that their R&D workforce is also involved in daily operations. Output will be optimized if these employees are not only engaged with explorative tasks but are also involved in exploitative activities. However, managers should also ensure that the appropriate organizational support is provided to individuals who attempt to combine exploration and exploitation. Multitasking individuals benefit the most from access to internal resources, whereas external resources are more efficiently allocated to explorative-only employees.

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## 1. Introduction

Employees who are able to allocate all of their time exclusively to research and development (R&D) are increasingly rare. By integrating basic research activities with business unit operations or by decentralizing the entire R&D department, firms aim to address current pressures to simultaneously meet long-term and short-term goals (DeSanctis et al., 2002), and furthermore, aim to establish ambidextrous organizations that support both exploitation and exploration (Raisch et al., 2009). Well-structured centralized organizations have transitioned to layered multi-dimensional systems in which employees must triage multiple obligations and shift between organically linked activities (Agypt and Rubin, 2012). In this environment, R&D team members must align their explorative R&D tasks with exploitative operations; in other words, they multitask, which we define as switching between R&D and operative activities or partly performing both tasks simultaneously (O'Leary et al., 2011).

Switching between explorative (i.e., research) and exploitative (i.e., operational) activities requires fundamentally different and inconsistent architectures and competencies, thus creating paradoxical challenges. A focus on exploration implies behaviors that are characterized by search, discovery, experimentation, risk-taking, and innovation, whereas a focus on exploitation implies behaviors that are characterized by refinement, implementation, efficiency, production, and selection (Benner and Tushman, 2003; March, 1991). Few employees possess these diverse qualities and we usually even consider these qualities to be irreconcilably antagonistic. Consequently, many individuals may show a low aptitude for multitasking and may be unable to profit from a combination of divergent tasks in the absence of additional organizational support (Agypt and Rubin, 2012). However, the breadth of experience and the interplay of contradictory requirements may also have positive effects on R&D performance (Griffith and Sawyer, 2010). Therefore, we aim to analyze how multitasking affects employee R&D performance and what support employees need to effectively combine tasks in the operational and R&D domains. To achieve these goals, we focus on the research activities of clinically active surgeons within academic medical centers (AMCs).

The relevance of a trade-off between clinical and research tasks in AMCs is highlighted by numerous publications on working and research conditions. Clinicians appear to be more highly valued

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by their organization if they spend more time on research. This value includes career prospects, resource access, and direct support from leaders (Wright et al., 2012). Many clinically active professionals are unsatisfied with the organizational support they receive for research, including intra-organizational collaboration, guidance for grant applications, and mentorship (Chung et al., 2010). Interviews with junior academics at Swiss AMCs revealed that clinical training and research activities interfere with one another and that insufficient research coaching and organizational resources hamper academic careers (Buddeberg-Fischer et al., 2009). In turn, research productivity and job satisfaction at AMCs profit from a supportive institutional environment, including access to research, mentoring programs, an organizational culture, leadership who emphasize research, and strong professional networks (Bland et al., 2005).

Personal insights from three surgeons (all male, between 35 and 42 years old and currently employed by three different German AMCs) emphasize the tensions between operational and research tasks. During explorative qualitative interviews, these surgeons stressed the dominance of daily business: “Currently, I only perform research during my free time while at the same time, neglecting my family.” (Surgeon 1); “You have to realize that your work is not able to schedule. It is very likely that you will be called to some emergency when you just sat down to write a paper” (S2). The interviewees further emphasized the relevance of organizational support: “What really helps is the access to labs and research offices, which in our institution support grant application, ethical reviews, and also statistical work” (S3); “If your boss and your team members are research driven, you start to think about doing research and also find help” (S1); “I try to go to a lot of conferences to clear my head from daily work” (S2). However, all three surgeons emphasized that clinical work and research may also be symbiotic: “Research in surgery includes the testing of new methods and instruments on patients, mostly as a part of clinical trials” (S3); “During a hip replacement that lasts several hours, you start thinking about potential improvements and innovations” (S2).

Existing research on the combination of divergent explorative and exploitative tasks has mainly focused on either organizational-level or individual-level processes. In the majority of the organizational studies, the tensions that multitasking creates are resolved at the organizational level. Structural mechanisms, such as R&D departments, are used to enable parallel successes in R&D and operations, whereas most individuals tend to focus on either explorative or exploitative activities (Smith and Tushman, 2005). In this existing research, the individual dimension of R&D team members, for example, is not explored further, and the relationship between multitasking and performance at the individual level remains unclear (Raisch et al., 2009). A separate stream of research on multitasking explores the cognitive and psychological consequences of switching between multiple tasks (Madjar and Shalley, 2008) but neglects to emphasize the organizational context. However, because individual-level processes are embedded in organizational-level processes, a multi-level approach is required (Mom et al., 2009). Consequently, we ask which complementary assets help employees who are active in R&D and operative tasks produce valuable R&D results. We focus on R&D performance because we believe that employees’ daily work is dominant, and the main danger is compromising with the relatively long-term explorative tasks.

In sum, we aim to develop a better understanding of whether and how the multitasking of R&D employees affects individual-level R&D performance. We address two important gaps in our understanding of the capability to achieve effective exploration in spite of operative commitments. First, the performance implications of multitasking remain unclear. Second, no conclusions have been drawn regarding the ability of relevant complementary

resources to moderate the multitasking-performance relationship. We thereby expand on the previous findings of individual multitasking research (O’Leary et al., 2011) and organizational ambidexterity research (Cao et al., 2009; Gupta et al., 2006).

Our empirical investigation is based on a sample of 332 surgeons from 20 academic medical centers (AMCs) in Germany. AMCs provide an excellent setting for research on multitasking because the physicians who work at these institutions must combine their R&D activities with daily clinical work and are therefore torn between explorative and exploitative activities. In the present study, we were able to combine three separate data sources. The individual-level R&D performance was measured by counting the citations of refereed journal publications that could be attributed to each surgeon and that had been indexed in the ISI Web of Science. To identify and describe the resource access, we relied on self-reported survey data. Information on the characteristics of each AMC as a whole was determined by examining external databases. To increase the validity of our results, we applied rigorous methods, such as data envelopment analysis (DEA) and negative binomial regression.

## 2. Theory and hypotheses

We use two streams of research as the foundation of our study: the literature on individual multitasking and the literature on organizational ambidexterity. Whereas the former is used to form arguments regarding the effects of multitasking on individual research performance, the latter emphasizes relevant complementary assets.

### 2.1. Multitasking and R&D performance

Because there is only a finite amount of time available, multitasking may create tradeoffs between the two distinct operational and R&D tasks, but investing more time in one task does not necessarily diminish the other, as suggested by the approach of organizational ambidexterity (March, 1991). Rather, both tasks may cross-fertilize one another. Exploitative activities and expertise provide the fundamentals for continuous improvement, but these elements must be challenged by explorative activities to allow new ideas to emerge. These new ideas, in turn, require exploitative activities to be successfully implemented (Bledow et al., 2009). In addition, we believe that accepting a variety of commitments may also increase learning due to a higher diversity of information and an obligation toward a higher individual efficiency.

By multitasking, employees are able to combine different types, sources, and categories of relevant knowledge that reduce the tunnel vision of more functionally fixed individuals (Harrison and Klein, 2007). Furthermore, Hirst and colleagues (2009) find that individual creativity benefits from combining and balancing antipodal activities. Multitasking motivates professionals to create new knowledge, particularly if they are able to see their R&D results implemented (O’Leary et al., 2011). During operative tasks, individuals may unconsciously process research-related information (Madjar and Shalley, 2008), and working in multiple and surprising environments drives professionals to question their existing knowledge and routines, thereby avoiding cognitive entrenchment (Dane, 2010). Smith (2009) proposes that engaging with contradictions simultaneously enables creativity, flexibility, and long-term success.

Furthermore, multitasking may increase the efficiency of research tasks because researchers focus their attention on the most promising topics (O’Leary et al., 2011) while continuing the efficient rhythm of operative processes throughout their creative

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