Interorganizational information processing and the contingency effects of buyer-incurred
uncertainty in a supplier's component development project
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Shortened product life cycles, faster technology advances, and increasing global competition have
forced buying firms increasingly invite their core suppliers in the early stages of new product
development (NPD) to leverage the suppliers’ knowledge and development capabilities for improving
their development performance (e.g., cost, quality and time to market).
Boeing's experiences with the development for its 787 model give us lesson learned to this point.
Boeing's 787 Dreamliner, which was jointly developed and manufactured by the company and its
global suppliers, had initially been hailed as a successful “posterchild” case of global supplier
involvement in NPD (Nolan and Kotha, 2005). However, despite these promising beginnings, Boeing
suffered from a series of part shortages, delivery delays, and quality problems (engine failures, fuel
leaks, battery fires), both while the planes were being produced and later on while they were in
service. This eventually led the Federal Aviation Administration (FAA) to ground all 787s temporarily in
2013 (Koh et al., 2013). The total cost of the 787 development project amounted to over $40 billion,
even more than twice the original budget (Shenhar et al., 2016).
In the comprehensive review of Boeing's 787 design and manufacturing system, the FAA and Boeing
uncovered that many of the reported problems resulted from “basic communication and coordination
issues” between Boeing and its suppliers (FAA, 2014, p. 12). Specifically, Boeing overestimated
suppliers' design and manufacturing abilities and falsely assumed that suppliers knew how to run their
businesses. As such, Boeing initially failed to transfer its tacit knowledge accumulated over decades
of development experience to its supplier partners (Lunsford, 2007). Thus, Boeing's design
requirements were not clearly communicated to its primary suppliers, and sometimes design
responsibilities about “who does what” were not clearly delineated (FAA, 2014). Hence it is not
surprising that suppliers often misinterpreted the design requirements and sometimes did not even
know who was responsible for them. In addition, in cases where Boeing did not establish specific
design requirements or where suppliers were not familiar with these, suppliers did not attempt to
adequately verify them with Boeing or resorted to industry design standards. In conclusion, Boeing's
insufficient transfer of information and knowhow, the introduction of many radically innovative
technologies, numerous and late engineering change orders, and the absence of face-to-face and
timely communication and coordination efforts among Boeing and its suppliers eventually effectuated
design deficiencies, variability in manufacturing, and abnormal part behavior or even failures.
This case of Boeing's 787 highlights that successful supplier involvement requires adequate and
accurate information exchange between the buyer and the supplier. This is in line with extant research,
which empirically validates that buyer firms' interorganizational information sharing facilitates joint
problem-solving, coordinates work schedules, and improves NPD project performance However, while
a majority of such past research has addressed the buyer's perspective, no research has yet
examined what challenges a supplier may face, as well as how the supplier can overcome these
challenges to achieve its own component development objectives. In this study, we answer this
questions by focusing on the role of a supplier's interorganizational information processing capabilities
in driving its component development performance by explicitly taking into account project
uncertainties arising from the buyer's actions.
Drawing from organizational information processing theory (OIPT), we conceptualize a supplier's
interorganizational information processing capability (IIPC) as the supplier's ability to collect,
assimilate, and integrate information from a buyer firm, and position it as critical to the supplier's
component development performance. Furthermore, taking a contingency perspective, we contend
that the value of the supplier's IIPC is significantly amplified or dampened by buyer-incurred project

uncertainty. We consider two types of buyer-incurred project uncertainty: task uncertainty and
relational uncertainty. Specifically, we consider two sources of task uncertainty, namely a buyer's
component novelty and a buyer's engineering change orders (ECOs). In addition, we view a buyer's
knowledge protectiveness as a source of relational uncertainty. A buyer's component novelty refers to
the newness of technical requirements associated with the component for the supplier. A buyer's
engineering change orders refers to the buyer's alteration of parts, drawings, or software that have
already been released to its suppliers during the product design process. And lastly, a buyer's
knowledge protectiveness is associated with how open and willing the buyer is in terms of sharing
information with its supplier. We differentiate our investigation by offering a comprehensive look at all
three sources of uncertainty from the supplier's perspective, and by hypothesizing the value of a
supplier's IIPC in driving better project performance to be amplified when the supplier faces either
higher component novelty or higher magnitudes of engineering change orders as initiated by the
buyer. In contrast, the more protective a buyer is of its knowledge, the more this will dampen the effect
of a supplier's IIPC on its performance.
The hypotheses are tested with data collected from 103 supplier component development projects in
South Korea. As a result, this study empirically demonstrates the significant effects of a supplier's
IIPC in enhancing the supplier's component development performance. In addition, we substantiate
that the magnitude of a buyer's ECOs positively amplifies the benefits of the supplier's IIPC, while the
buyer's knowledge protectiveness significantly hampers it.
Within this context, our research advances understanding of supplier involvement in NPD in the
following ways. First, taking a supplier's perspective, we examine a supplier's ability to process
information in a component development setting as a part of a buyer's NPD project, an aspect that
has not been explored in prior studies. We thus complement the buyer-centric perspective of the
extant supplier involvement literature by validating the criticality of interorganizational information
processing from the supplier's viewpoint. And second, we empirically substantiate the contingency
effects of buyer-incurred project uncertainty on the effectiveness of a supplier's IIPC for its component
development performance. Although uncertainty has been studied in prior NPD research, scant
attention has been paid to how buyer-incurred—yet unintended—project uncertainty influences a
supplier's component development performance. By examining such contingency effects from the
supplier's perspective, we shed new light on how a buyer's behavior can influence the supplier's new
component development environment.

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