When Internal Networking Undermines Innovation

Formal and informal communication networks often corrupt rather than complement one another.

In addition to its technical difficulties, designing an engine for commercial aircraft poses a daunting logistical challenge. Since each failed iteration can cost the manufacturer millions, it is imperative that the efforts of dozens of design teams be smoothly coordinated, which is easier said than done considering that the simplest tweak from one team can affect the work of many others. If the teams aren't communicating enough about their points of overlap, expensive errors may occur.

Organisational theory has a lot to say about what drives the formation of informal – often task-related rather than baked-in to the organisational structure – communication networks amongst teams. One noteworthy factor is common third parties. If Teams A and B often work with Team C, it's more likely that A and B will communicate. Therefore, researchers theorise that the likelihood that two design teams will fail to exchange relevant information is inversely proportional to the number of third-party relationships they hold in common.

Triangular relationships between product development teams are not uniformly positive, however, as **Manuel Sosa**, INSEAD Associate Professor of Technology and Operations Management, and I have explored in articles for ***The Journal of Product Innovation Management*** and ***Organization Science*** (the latter co-written by Craig Rowles of Ei3 Corporation). Informal channels of communication can backfire when they intersect with features of the organisational structure that inhibit information exchange. Our findings warn managers that formal and informal modes of communication can corrupt as well as complement one another.

Building Boeing's engine

We studied the ten-month detailed design phase of the Pratt & Whitney PW4098 commercial engine for the Boeing 777 aircraft, whose project architecture grouped 54 design teams, each responsible for an individual engine component, into eight clusters based on the subsystem to which their component belonged. There were also six functional teams that worked across all eight subsystems. Based on questionnaires and interviews, we tracked inter-team interactions for the entire duration of the project, focusing on how pertinent technical information was exchanged.

A general finding was that for a pair of teams that would have benefited from such information exchange – whose outputs were interdependent – having a communication partner in common could either prevent or promote communication, depending on how the triangular relationships (or "triads") were structurally situated. Put simply, the bonding effect of common third parties was quite strong when the third party's role in the relationship

was mainly to connect and lubricate the channels of communication between the other two. Communication broke down, however, when the third party's own designs would have been affected by the interaction of the other two, thereby creating the possibility for a laborious iterative cycle to be triggered between all three.

The "dark side" of informal networks

Organisational structure helps explain this phenomenon. If the shared third party in a triad outranked the other two in the organisational hierarchy, he or she could instruct them not to communicate with one another so as to both simplify matters and keep hold of the reins. After all, one of the prerogatives of power is forcing others to conform to you rather than the other way around. Awareness of impending deadlines and R&D expenditure would presumably be extra incentives for higher-ups to freeze conversation amongst network partners.

But if the rush to consensus results in the bottom corners of the triad not having enough time to align on all their interdependencies, issues may not surface until it's too late. In industries such as aerospace, the necessary rework could entail eye-watering cost overruns. Even a minor error could be a major headache if it shortens the lifespan of the product. In the case of the PW4098 engine, for example, each maintenance removal could cost the customer as much as US$150,000, in addition to lost revenues associated with a grounded plane.

Managerial takeaways

Managerial interventions should be targeted toward identifying the triads most likely to be involved in iterative cycles, and helping them manage the trade-off between pushing toward a collective conclusion and allowing for investigation of all relevant task-related overlaps. Where possible, managers should simplify the complex web of interdependencies that create the conditions for cycles to arise in the first place.

Failing that, managers can use the levers at their disposal to forestall communication disruptions between interdependent teams. We know that proximity, for example, is a key element in the formation of communication ties. So a good way to get two teams talking might be simply to position them close to one another. One should also try to work around any issues (for example, interpersonal conflicts among team leaders) which may act as additional conversation-stoppers.

There is also a larger message here about the dreaded "silo mentality", which is widely considered the enemy of lively information exchange. Managers often assume that if they just encourage teams to engage across organisational boundaries, critical conversations will naturally occur. Our findings show that, in fact, the medicine prescribed to cure the silo mentality – informal communication networks – can have serious side effects when its interaction with the formal organisational structure isn't well managed.

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