



## Impact pathways: Towards an adapted understanding of the development of operational capabilities

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# IMPACT PATHWAYS

## Towards an adapted understanding of the development of operational capabilities

In our exchange with executives, we have noticed that world-class businesses seem able to perform well across all main competitive capabilities. Compared to competitors, they offer shorter lead times, better quality, higher variety, better sustainability performance, and generally more value for money. The literature has suggested ways to achieve this, and we were therefore surprised to learn that many of these companies appear to dismiss both tradeoffs and a sequence of capability building suggested by leading scholars. Digging deeper, we learned that they seemed to dynamically and continually rotate their focus among the operational capabilities depending on the situation they were facing. This was an intriguing observation to which the extant literature on operational capabilities did not provide an explanation.

For more than three decades, operations management (OM) scholars have attempted to describe the development of operational capabilities in organizations. However, the focus has mostly been on tradeoffs or sequential development, and no models include rotating foci. So, are the old models wrong, or in need of revision? In this *Impact Pathway* article, we identify new and highly relevant challenges and questions for the OM community regarding capability development. Answering these questions is fundamental to the discipline because operational capability development is at the core of OM.

In this paper, we present our emerging understanding of how the OM community should start challenging and extending the existing models. We elucidate on how operational capabilities are *interconnected*, how they *interact*, and suggest that they likely dynamically *evolve* in a company's given environment.

### The state-of-the-art

Companies are competing on the development of operational capabilities like cost efficiency, quality, delivery, flexibility, and, more recently, sustainability. The question is not whether capabilities matter but how to build and sustain them most efficiently. Our field (see online Appendix C) has been trying to find an answer to this question since the mid-1990s, and a review of the literature reveals three key shifts in thinking – with this pathway, we want to point out the need for the next shift.

Skinner (1969) introduced the *Tradeoff Model* in the 1960s. It suggested that improvements in one capability can only be achieved at the expense of others. For example, the tradeoff idea suggests that quality comes at a price, meaning companies cannot be very cost-efficient and simultaneously deliver very high quality.

In the 1990s, the *Cumulative Capabilities Model* was suggested as a fundamentally different approach to tradeoffs (Ferdows and De Meyer, 1990). One primary reason for its emergence was that cutting-edge companies of that time—in particular Toyota Motor Corporation—offered high-quality products at low costs and faster than any of its competitors, which contradicted the central thesis of the Tradeoff Model. The new

Cumulative Capability Model entails that the four classic capabilities—quality, dependability, speed, and cost—do not have to be traded off against each other but can be built up sequentially in precisely this order (see online Appendix B). A key point in the cumulative model is that investments in higher-level capabilities require continuous further investment in lower-level, more fundamental capabilities—of which quality is most fundamental. Building capabilities cumulatively is like pouring sand, layer by layer, into a sandcone: the lower capabilities grow broader as the higher capabilities are built.

After substantial empirical testing of these two prevalent models, scholars have dismissed the universality of both. Tradeoffs do not seem to exist in a meta-analysis of the literature (Rosenzweig and Easton, 2010b), studies find other sequences than the originally suggested one in the Cumulative Capability Model (Flynn and Flynn, 2004), and new theory seeking to integrate both is based on firms' resource orchestration, which is hard to measure. There is little doubt that these theories are valuable and offer helpful perspectives, but overall they have not been subject to robust confirmation (Schmenner and Swink, 1998; Vastag, 2000). Scholars have instead derived various hybrid models (Hallgren *et al.*, 2011; Rosenzweig and Easton, 2010a). We seek to redirect the scholarly attention towards working on a universal model in this *Pathway*.

### **Methodological approach**

This pathway paper was motivated by our finding that companies regularly have difficulties developing their capabilities according to the tradeoff model or the capability development model. These insights stem partly from discussions with industry partners and executives in MBA or other programs and partly from teaching these models ourselves. This led us to engage in a deeper exploration of operational capability development knowledge (see Figure 1).

We started with a systematic review of the literature searching premier OM journals (see online appendix A). After our literature review, we contacted one of our key industry partners, Lufthansa, to discuss and better understand modern capability development. One of the company's senior executive managers began collaborating with us on this project and has co-authored this paper. In 2020 and 2021, we conducted a series of repeated in-depth interviews and discussions with the head of continuous improvement and the accountable manager.

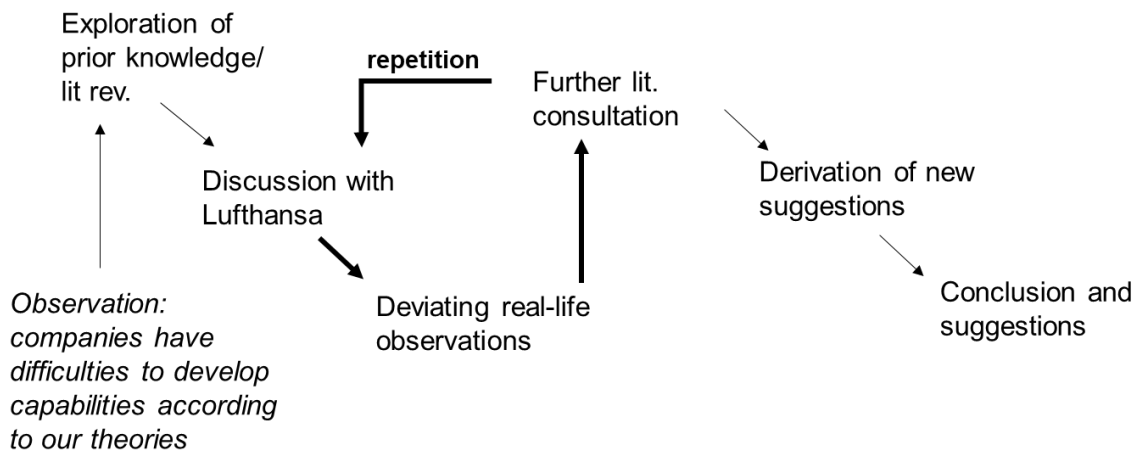


Figure 1: Path of research based on the abductive research process

Our engagement with this company and the literature allowed for the iterative development of new thoughts regarding capabilities. This abductive approach of creating new knowledge by circulating between evidence and theory is common in our discipline but is often hidden behind more accepted terms such as deduction or induction. However, the linkages and observations we share in this study are less deterministic than what deduction or induction would produce.

We explain our resulting conclusions and suggestions regarding capability development in a current business context with all its complexity. We do not claim that the preliminary conclusions we derive from this process are universally true, or even that they are the only conclusions that can be derived; what we offer is a first, intuitive theoretical leap of thought that calls for further work and examination. Hence, a *pathway* for the future.

### **Introducing the Idea of Hub-and-Spoke Capabilities**

Our goal is to share our collective insights from working with industry partners, particularly Lufthansa, and suggesting a pathway forward for rethinking existing models. We were particularly interested in looking at Lufthansa because the recent pandemic has forced Lufthansa and its subsidiaries to rethink their business model and potentially enter new markets. As a result, Lufthansa is in the midst of a process of questioning and re-evaluating its operational capabilities and taking a hard look at its competitors.

In our discussions, we quickly noticed that the better-performing companies are not sticking to static competitive priorities. Instead, they appear to dynamically rotate their focus among capabilities, allowing them to account for resource limitations, move at a fast pace, and respond to competitive pressure. We present our thoughts and observations, and explain how they may expand and change our view of the legacy models. We try to summarize these thoughts in what we call the Hub-and-Spoke Capability View.

We conclude that it is unlikely that a one-size-fits-all model can explain the development of operational capabilities in modern organizations. Therefore, one of the

premises of the Hub-and-Spoke Capability View is that it provides a company-specific dynamic perspective on operational capabilities. Companies typically first try to identify the specific capabilities that have positive and strong links to other capabilities and then invest in them. Each company seems to have a different and context-specific starting point. This observation questions the assumptions of the Cumulative Model. Rather than viewing capabilities as cumulative or sequential, they appear to be interconnected in a more complex and ever-changing network structure. In what follows, we attempt an initial reflection on these observations. It is this network structure that seems to be one of our most important observations, and one that leads to a questioning of previous models.

### *Characteristics that allow context-specificity*

First, for managers to understand how they best grow their capabilities, they would need to develop a deeper understanding of their existing capabilities. For this purpose, we discuss and propose four characteristics against which a company's capabilities could be evaluated and ranked. The capabilities are ranked from low to high, in relative terms, along the following four characteristics and relative to each other:

- (1) The level of capability interconnectedness
- (2) The level of resource adjustment
- (3) The level of resource performance intensity
- (4) The level of path dependency

Importantly, and as an advancement to the legacy models, the definitions of capabilities can look different for each company and their relative rankings along the four characteristics will likely change over time. We detail our thoughts the four characteristics that help map the operational capabilities in the next paragraphs.

The first characteristic, the *level of capability interconnectedness*, represents the relative number of positive connections and respective strength of linkages a specific capability has with other capabilities. Low capability interconnectedness refers to a relatively isolated capability with few strong relations to others. High capability interconnectedness indicates connection to many other capabilities via relatively strong relationships. If a capability has strong existing relationships with other capabilities (i.e., it impacts or is impacted by other capabilities), it is described as the *base capability*. It is crucial to build it before developing prolificacy in other capabilities. This thought goes along the lines of arguments put forward around quality in the cumulative capability model; yet it must not always be quality.

The second characteristic is the *level of resource adjustment*. It represents the relative number of structural and infrastructural changes required to improve the prolificacy in a specific capability dimension. The necessity for a relatively large number of adjustments to further improve the capability indicates a high level of resource adjustment. Structural input factors concern the managerial, plant, and process design decisions, whereas infrastructural input factors are, for example, tangible equipment and facilities (Vastag, 2000). To give practical examples; if your business is oil fracking, improving sustainability capabilities could have a high level of resource adjustment.

The third characteristic, *resource performance intensity*, assesses the relative difficulty of releasing and generating value from a specific capability. Resource performance intensity entails that the magnitude of the immediate performance implication of a capability, once it has been built, will differ from other capabilities. Low levels of resource performance intensity indicate that it is challenging or takes long for companies to generate value from that capability. High levels, on the other hand, indicate that the capability releases value relatively easily and quickly. Essentially for some capabilities, it is easier to reap the performance benefits and generate immediate value than for others. This refers to immediate performance gains and not to improvements in other capabilities (see capability interconnectedness).

The fourth and final characteristic is the *level of path dependency*. It takes into consideration how dependent the development of a specific capability is on earlier managerial choices. Therefore, it indirectly also includes the time required to improve a capability since higher dependency on earlier choices logically points to a need for significant preparation. Low path dependency indicates that the capability is developed relatively quickly with little necessity for preparing grounds via earlier managerial choices. High levels, however, indicate that the capability heavily depends on earlier choices, offers a restricted set of development paths, and is likely to take time to develop. Thus, path dependency is tightly connected to the resource adjustment dimension, but instead of focusing on the structural and infrastructural resources needed, it focuses on past decisions (both regarding operating policies and infrastructure) and how they affect the potentials to achieve prolificacy.

### *Bursting versus merging capabilities*

These four characteristics pose our initial thoughts on how one could characterize capabilities. They may help us to understand the overall relationships and hierarchies between capabilities, and ultimately lead to an improved description of how modern companies efficiently allocate resources to capability development. A central tenet of what we share here is the configuration of characteristics that makes a capability important in affecting and developing other capabilities within a company.

We conceptualize and visualize this observation by categorizing capabilities into *bursting* versus *merging* capabilities. Bursting capabilities are the starting point for investments whereas merging capabilities should not be used as leverage points. Bursting capabilities help to develop merging capabilities (Figure 2). Thus, a bursting capability is instrumental to develop other capabilities. It is thus in the middle of the hub-and-spoke model having high levels of interconnectedness (besides others). A bursting capability has

- a HIGH level of capability interconnectedness (i.e., it has strong potentials to affect other capabilities),
- a LOW level of resource adjustment (i.e., it requires a relatively small number of adjustments to further improve the capability),
- a HIGH level of resource performance intensity (i.e., it releases value relatively easily and quickly), and



- a LOW level of path dependency (i.e., it does not depend heavily on earlier choices or requires lots of time to improve).

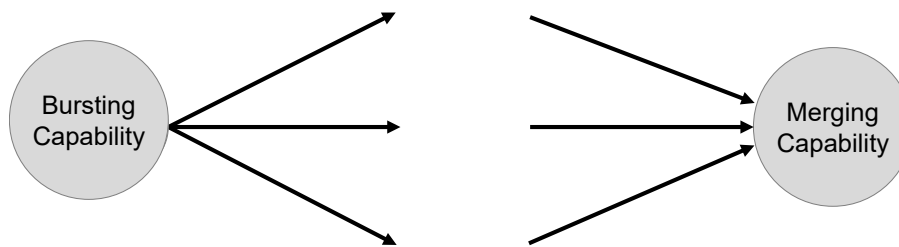
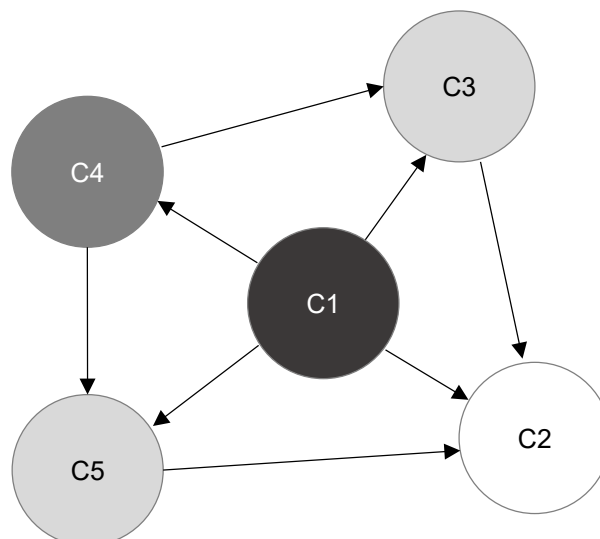


Figure 2: *Bursting versus merging capabilities*

Managers going through the process of assessing their operational capabilities should identify which of their capabilities are bursting or merging and can go on to make better targeted investment decisions with this classification.

Again, these are initial thoughts from our discussions that need to be confirmed empirically. However, if we assume that we are on the right track with this framework, then managers can create their company-specific Hub-and-Spoke View that shapes the development of their capabilities. A thought example is shown in Figure 3. The capability that ranks the highest across all four characteristics is placed at the center of the model (C1); thus, it is centric (a bursting capability). The centric capability is bursting out into the capabilities on the outside, which are peripheral. It is the capability in which resources seem to be most efficiently invested. And on the periphery are the merging capabilities.



Notes: C indicates a capability. Darker shading indicates a bursting capability with centric positioning; lighter shading indicates a merging capability with peripheral positioning.

Figure 3: *A Hub-and-Spoke Capability View with five capabilities*

Rating the capabilities based on the four characteristics can provide a good snapshot of the interrelations and hierarchies of the capabilities in a particular organizational context. The profile thus allows for company-specific applications tailored to different empirical contexts avoiding reductionist or overly abstract generic models with normative assumptions that do not hold across contexts (Flynn and Flynn, 2004). We believe that depending on the industry's clock speed, regular reassessments are needed.

### **Pathways: Towards Rethinking Competitive Capability Building**

In this paper, we have tried to show and argue why traditional models for operational capabilities building cannot explain (anymore) why some companies succeed and others fail in efficiently developing their capabilities. We have presented some new insights of thinking about building operational capabilities and shared them with the community in the hope that this will spur new research in this direction. If we as researchers in OM cannot yet properly explain how operational capabilities are best built, then we have not yet answered one of the fundamental questions of our discipline.

We find that the established models cannot reflect that capabilities, either because of recent development or perhaps always, appear to be interconnected in a more complex and ever-changing network structure. We also conclude that no one-size-fits-all model currently can explain the development of operational capabilities. A new model must be flexible enough to take into account the firm-specific context in which capabilities are developed – that is how capabilities are interconnected within the firm, what changes are needed to improve the capability, how difficult it is to unlock the value of a capability, and how much the development of a particular capability depends on previous management decisions.

*Sustainability as an operational capability:* Finally, we do not believe that the ideas of the tradeoff model should be disproven per se. While our findings have shown that some of the best companies try and succeed in being good at multiple capabilities at the same time, we still believe that some capabilities are regularly ignored by companies and therefore willingly traded off. We are thinking of environmental and social sustainability. These capabilities are not readily visible to customers, unlike quality, delivery, cost and flexibility. Customers often rely on labels, certificates and company statements, but can rarely feel and experience the company's performance in this area. Future research can therefore be of great benefit to our discipline if it places a special emphasis on the network interaction between the traditional capabilities (quality, delivery, cost, flexibility) and the new capabilities (sustainability, social responsibility) to see and learn how the latter are affected by the former and vice versa. There is no doubt that we need to include sustainability in the new model and think about how it can be developed. To be considered sustainable, companies must perform well in all three dimensions of the "triple bottom line," i.e., social, environmental, and economic performance – the pressing issues of sustainability do not allow compromise in this respect, and if they do, it will not be at the expense of the environment and society.

*Start talking to managers again:* We like to think of OM research as practical and applied. However, in recent years we have seen a tendency in scholarly work to engage less with industrial practice. We still rely on the old models of operational capabilities, but the industry has evolved, and those models cannot satisfactorily explain the observations we made in leading companies. One of our goals with this Pathway paper is to inspire the OM discipline to go back into companies and talk to managers to gather insights and share them with the community. While it is unlikely that a single study can develop the new model of capability development, we hope that a series of detailed reports will eventually help us identify patterns. Along the way, we hope to motivate colleagues to follow our approach and report their findings. Gaining such insights can only help us develop more accurate theories.

Based on our work with Lufthansa, we have outlined our initial findings about this process. We presented the idea of the Hub-and-Spoke Capability View. Figure 4 shows the four-step process that we think are reasonable to follow when applying the ideas of Hub-and-Spoke Capability View. Our goal with this View was to organize our findings about the dynamic and complex decision to invest in operational capabilities into clear structures.

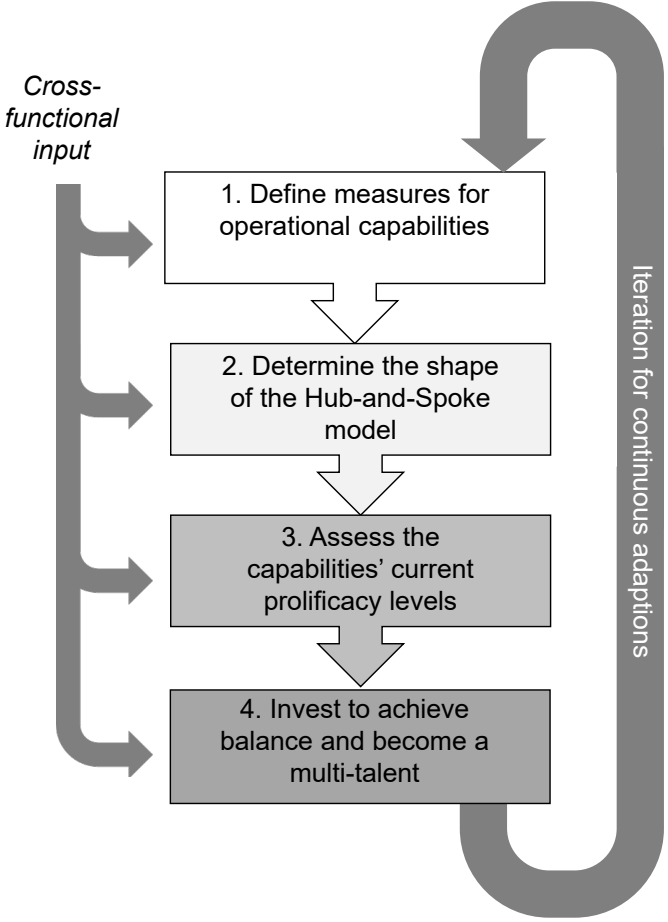


Figure 4: *The four steps for achieving a balanced state of capabilities*

*Adapt to the empirical context of the modern organization:* Almost (but not quite) unnecessary to mention is that the organizational context (life cycle, market or industry standards, or technology constraints) is also very likely to play a major role in capability development. So, we should extend our efforts to different industries. Much past research was based on the automotive industry and other large manufacturing companies with strong vertical integration. But value creation is increasingly taking place in less integrated companies. And new value creation models are changing the rules of business. Digital technologies are driving new business models and the rules of the data economy – the sharing and trading of data – are fundamentally changing industrial production processes. So, when engaging with the industry, we believe that it would be highly valuable to the discipline to engage with less integrated manufacturing industries and services. Particularly the latter have been largely ignored in OM efforts.

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