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The long and winding road: Routine creation and replication in multi-site organizations

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ABSTRACT

Prior research on organizational routines in the 'capabilities' literature has either studied how new routines are created during an exploratory process of variation and selection *or* how existing routines are replicated during a phase of exploitation. Few studies have analyzed the life cycle of new routine creation *and* replication as an integrated process. In an in-depth case study of England's Highways Agency, this paper shows that the creation and replication of a new routine across multiple sites involves four sequential steps: envisioning, experimenting, entrenching and enacting. We contribute to the capabilities research in two ways: first, by showing how different organizational levels, capabilities and logics (cognitive and behavioural) shape the development of new routines; and second, by identifying how distinct evolutionary cycles of variation and selective retention occur during each step in the process. In contrast with prior research on replication as an exact copy of a template or existing routine, our study focuses on the replication of an entirely new routine (based on novel principles) that is adapted to fit local operational conditions during its large-scale replication across multiple sites. We draw upon insights from adjacent 'practice research' and suggest how capabilities and practice studies may complement each other in future research on the evolution of routines.

1. Introduction

Routines are defined as the "regular and predictable behavioural patterns of firms" (Nelson and Winter, 1982: 14). Organizations learn and adapt to the environment by encoding inferences from history into routines that guide behaviour (Levitt and March, 1988). Routines serve as stores of organizational memory, skills and tacit knowledge (Nelson and Winter, 1982; Cohen and Bacdayan, 1994) and are conceived as the building blocks of organizational capabilities (Winter, 1995; Felin et al., 2012). Organizations develop, stabilize and follow routines over extended periods of time and adapt to a changing environment by reconfiguring routines, creating new ones and using them consistently across organizational sites (Zollo and Winter, 2002).

In this paper we identify and analyze how new routines are intentionally created and reproduced with some degree of consistency and uniformity across multiple sites in an organization. Since Nelson and Winter's (1982) foundational work, research on routines has divided into two streams: the capabilities and practice perspectives (Parmigiani and Howard-Grenville, 2011). Capabilities research treats routines as whole entities and investigates how firms manage a portfolio of routines to achieve competitive advantage. Within this stream, research has either studied how dynamic capabilities are deployed in the search for new routines (e.g. Teece et al., 1997; Zollo and Winter, 2002) or how stable routines are replicated across multiple sites (Winter and Szulanski, 2001; Szulanski and Jensen, 2006; Winter et al., 2012). With its focus on the internal dynamics of routines, practice research shows how routines, once conceived as stable, can be a source of flexibility and change when performed by agents, but has paid less attention to how entirely new routines are created (Obstfeld, 2012; Feldman et al., 2016; Dionysiou and Tsoukas 2013; Salvato and Rerup, 2018).

Overall, surprisingly little research attempts to understand how the creation *and* replication of new routines is conducted as an integrated process over time (Gupta et al., 2015). Identifying this process is important as part of current research efforts to understand how routines come into being and stabilize (Obstfeld, 2012; Feldman et al., 2016, Dionysiou and Tsoukas 2013) and how routines are assembled into capabilities (Eggers and Kaplan, 2013). In addressing this issue, we

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adopt a capabilities perspective because we are interested in understanding how new routines – treated as whole entities – can be targets for managerial interventions and intentionally developed to achieve an organization's strategic objectives (Nelson and Winter, 1982; Winter and Szulanski, 2001; Zollo and Winter, 2002; Levinthal and Marino, 2015)

In capabilities research, the evolution of new routines occurs when organizations generate new patterns of action and selectively retain the most successful elements (Nelson and Winter, 1982; Zollo and Winter, 2002). Zollo and Winter (2002) developed an evolutionary model of variation, internal selection, replication and retention showing how routines emerge and stabilize over time. This evolutionary process takes place within a 'dual-routines' structure (Nelson and Winter, 1982; Zollo and Winter, 2002): senior managers employ dynamic capabilities (higher-order routines) in the systematic search to change, create and replicate 'lower-order' operational routines (e.g. Teece et al., 1997; Zollo and Winter, 2002). Despite these important theoretical advances, however, few empirical studies examine how new routines are created in contexts that require their 'rapid' reproduction across sites.

Building on Zollo and Winter's (2002) model and other streams of capabilities research, we identify the specific organizational processes involved in the development and reproduction of new routines. In contrast with the traditional conceptualization of replication as an exact copy of an historical template or existing routine with high fidelity to the original as often occurs in industries such as banking or retailing (Winter and Szulanski, 2001), our study focuses on the uniform and consistent reproduction of an entirely new routine based on novel principles (Baden-Fuller and Winter, 2005) that is adapted to fit local operational conditions during its large-scale replication across multiple sites (Jonsson and Foss, 2011). Our research responds to calls for 'multi-level research' by showing how the process is shaped by different levels – strategic and operational – in an organizational hierarchy (Salvato and Rerup, 2011).

To address our research question we carried out an in-depth case study of how a large public-sector organization – England's Highways Agency – developed and implemented a new routine across multiple sites responsible for maintaining England's network of highways and trunk roads. We contribute to capabilities research on routines by providing a more fine-grained account of the specific processes involved in the life cycle of new routine creation and replication. Our model shows how actors working in different organizational levels (strategic and operational) interact during key phases (exploration and exploitation) in the process. We identify four sequential steps from the original decision to introduce a new routine to its widespread implementation across multiple sites: envisioning, experimenting, entrenching and enacting. Managers working in strategic and operational units perform distinct steps in the process as they navigate the long and uncertain path from routine creation to replication. By investigating how evolutionary processes occur in an empirical study, we show that there is no one-to-one correspondence between broad-level stages of variation, selection and retention and the specific steps and activities undertaken in actual practice.

The paper is organized as follows. Section 2 reviews the literature providing alternative conceptualizations of how routines are created and replicated as an organizational process; Section 3 describes our method and data; Section 4 introduces our research setting; Section 5 presents our findings; Section 6 identifies our contribution to research on routine development and offers suggestions for future research; and Section 7 provides a summary of our research.

2. The creation and replication of organizational routines

2.1. Evolutionary theory of routines and capabilities

Building on the work of the 'Carnegie School' (March and Simon, 1958; Cyert and March, 1963; Gavetti et al., 2007), Nelson and Winter (1982) developed the concept of routine as the basic unit of analysis in an evolutionary theory of organizational change by natural selection. Nelson and Winter (1982) focused on the stable, predictable and learned 'behavioural' patterns of routines, whereas the Carnegie School emphasized the 'cognitive' decision rules, standardized operating procedures and other mental models that guide routine behaviour (Becker 2004; Salvato and Rerup, 2011). Nelson and Winter (1982) identified how organizations search and selectively retain entirely new routines when prevailing ones no longer provide an adequate response to environmental pressures by following a problem-solving sequence: "select element, test for desired attributes, terminate with success if attributes are present, select next element if they are not" (Nelson and Winter, 1982: 132).

The distinction between routines conceived as cognitive rules (Cyert and March, 1963) or behavioural regularities (Nelson and Winter, 1982) is avoided in more recent capabilities research showing how the two logics complement each other (Gavetti and Levinthal, 2000; Becker, 2004; Gavetti, 2005; Levinthal and Rerup, 2006; Eggers and Kaplan, 2013). Gavetti and Levinthal (2000) suggest that organizations engage in a cognitive and experiential search when existing routines are no longer appropriate in a changing environment and there is a perceived need to modify or replace them (Gavetti and Levinthal, 2000). Cognitive learning involves generating and assessing 'offline' analysis, experiments and consultations without implementing new practices or changing routines. Experiential learning occurs 'online' when actors engage in an activity in order to evaluate it and assess the performance of alternative practices, trial experiences and adjustments to routines. Whereas cognition refers to the 'forward-looking' rationality used to evaluate a broad set of alternatives, experiential learning depends on 'backward-looking' knowledge which accumulates as result of prior choices and behavioural patterns that change as a result of feedback from experience.

In evolutionary theory, routines are the building blocks of a firm's capabilities (Winter, 1995) located at two different levels of an organizational hierarchy. Influenced by Nelson and Winter's (1982) dual-routines framework, a distinction is made between dynamic capabilities at the strategic level and routines performed at the operational level (e.g. Helfat and Peteraf, 2003; Becker 2004; Helfat and Winter, 2011; Teece, 2007; Peteraf et al., 2013; Di Stefano et al., 2014). The collection of 'lower-order' routines performed to produce a product or provide a service are part of a firm's operational capabilities (Helfat and Peteraf, 2003; Helfat and Winter, 2011).

Dynamic capabilities are the 'higher-order routines' employed by top managers to intentionally build, integrate and reconfigure operating routines in response to a changing technology or market environment (Teece et al., 1997; Zollo and Winter, 2002; Winter, 2003; Knott, 2001; Easterby-Smith et al., 2009; Daneels, 2008, 2010; Ethiraj et al., 2005; Helfat and Winter, 2011) and select a routine for widespread replication (Winter and Szulanski, 2001; Teece, 2007). The dual-level distinction in capabilities research provides us with a broad framework to investigate how the process of routine creation and replication is shaped by different levels in an organizational hierarchy (Salvato and Rerup, 2011; Lazaric, 2011) – strategic and operational. Zollo and Winter (2002) provide an overall description of the process, but little research has attempted to investigate empirically how dynamic capabilities and operating routines interact in a hierarchical relationship during routine creation and stabilization.

2.2. Routine creation

In capabilities research, the creation of new routines is conceptualized as an evolutionary process of variation, selection and retention, which when consistently undertaken constitutes a dynamic capability. Zollo and Winter (2002) suggest that routines evolve through four stages in knowledge cycle.

First, in the generative variation stage, individuals or groups engage