Innovation, Change and Rule-breaking

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Abstract:

Competitive dynamics impact a firm's necessity to adapt its capabilities permanently and to generate innovations continuously. Therefore, management practice claims for continuous change and the generation of substantial innovations. However, to a certain degree, change and innovation are associated with a break of a firm's existing mode of operation. Routines and underlying rule-systems become object of change intentions. Concurrently, processes and structures are streamlined and, therefore, "rule-breaking" is inhibited. Firms oscillate between stability and change. This paper synthesise concepts of organisational routines, rule-systems and dynamic capabilities. Thus, a conceptual model of organisational learning in terms of rule-breaking as the basis for innovation and change is provided. Moreover, it integrates the topic of organisational non-learning – the defence of change impulses – whereby an organisation achieves stability and strengthens its identity. The firm's development is characterised by the ratio between dynamic and perpetuation capabilities. These transformation/perpetuation routines facilitate and restrict the extent to which operational and innovation routines can be modified. Rule-breaking on this level represents first-order organisational learning. Second-order organisational learning occurs when the rules of underlying transformation/perpetuation routines and, consequently, the ratio between them become object of change. Finally, various forms of organisational design are analysed in regard to their potential for rule-breaking.

1 Introduction

In most markets, competitive dynamics impact a firm's necessity to adapt its capabilities permanently and to generate innovations continuously (Roberts & Eisenhardt, 2003). Therefore, management practice claims for continuous change and the generation of – most preferably – rule-breaking innovations, as Schumpeter (1934) described with his concept of "creative destruction". However, to a certain degree, change and innovation are associated with a break of a firm's existing mode of operation. Routines and underlying rule-systems

become object of change intentions. Thus, the firm's variability to change and to innovate should be enhanced. Concurrently, an optimisation of existing processes and structures is taken by granted. In many cases, these improvements provide a basis to streamline the existing organisation, inhibit "rule-breaking" and, therefore, eliminate options for change and innovation. Thus, the firm's efficiency should be increased. Consequently, firms oscillate between stability and change. Gibson & Birkinshaw shape the concept of ambidexterity in order to emphasise the trade-off between adaptability and alignment (Birkinshaw & Gibson, 2004; Gibson & Birkinshaw, 2004). March (1991) uses the differentiation between exploration and exploitation in a similar context. However, many attempts of intended change fail in regard to both, variability and efficiency.

The concepts of organisational routines and rule-systems and the dynamic capabilities-approach offer analytical explanations for organisational dynamics, change, and learning. But up-to-date, explaining models for substantial changes of organisational routines and dynamic capabilities (change routines) are rare: "(...) the literature does not contain any attempt at a straightforward answer to the question of how routines – much less dynamic capabilities – are generated and evolve" (Zollo & Winter, 2002:341). This paper picks up this research gap by providing a conceptual model of organisational learning in terms of rule-breaking as basis for innovation and change. However, organisational non-learning – the defence of change impulses – must be considered concurrently. Argumentation is anchored into the overlapping research streams to organisational routines, rule-systems as well as dynamic capabilities. Thus, the following research questions are answered:

- Which interrelationships exist between organisational routines and dynamic capabilities regarding underlying rule-systems?
- How can organisational learning or non-learning be described in terms of rule-breaking?
- Which organisational design enhances or limits the intensity of potential rule-breaking?

At the beginning of this paper, research to organisational routines, rule-systems and dynamic capabilities are presented. Subsequently, a rule-based model of organisational capabilities is developed providing the basis for the discussion of

rule-breaking, change and innovation. In this regard, organisational defence mechanisms inhibiting rule-breaking are analysed. Finally, various contexts of organisational design are analysed regarding their potential to stimulate or prevent rule-breaking.

2 State-of-the-field on Organisational Routines, Rule-systems, and Dynamic Capabilities

The literature of this field can be classified into three – in part interrelated – research streams: organisational routines, rule-systems and dynamic capabilities. The paper on hand presents a rule-based model of organisational capabilities integrated these research streams in order to explain innovation and change. Organisational capabilities are based on rule-systems that allow the performance of various routines (Winter, 2000). The term capability is only used for routines that are of strategic importance. Other routines are perceived as standard operating procedures. They lack of strategic importance as they can be performed differently without significance impact on firm performance or can be outsourced (i.e. bought on factor markets).

This approach refers to the consideration that organisational rule-systems act as the stabilizing core of organizations. Similarly, in most cases, change and innovation are rule-guided and, consequently, path-dependent, following observable pattern of development. Rules anchored in rule-systems are the unit of analysis. Metaphorically phrased, rules can be conceived as genes of organisations. In this logic, rule-systems can modify and mutate over the course of time. The development of rules and rule-system is path-dependent as their evolution is limited through past experience. Organisations establish mechanisms in order to limit change and development, but they secure stability and identity.

However, based on existing research two extensions are carried out. First, organisational rules are conceptualised as the stabilising structure of organisational routines. Rule-systems are perceived as a hierarchy of organisational rules. Therefore, the model developed within this paper, integrates different categories of rules (e.g. dynamic capabilities as change and transformations rules) that are ordered hierarchically. Moreover, rule-systems consist of explicit and tacit rules, as both characteristics govern the organisation’s behaviour substantially (section 2.1).

The second extension concerns dynamic capabilities. Dynamic capabilities are seen as routines facilitating organisational change. However, the firm's ability for change is limited and research lack on explanations of resistance to change intentions and to non-learning behaviour. Dynamic capabilities as learning mechanisms and their counterpart in the form of perpetuation capabilities as non-learning mechanisms (organisational defence mechanisms) are integrated in the model in order to explain resistance to change and, therefore, inhibit rule-breaking (section 2.2).

2.1 Organisational Routines as Rule-systems

The organisational routines-approach analyses and explains, how firms develop and change repetitive pattern of behaviour that are basis for the production of goods and services (Becker, 2004; Becker, 2005; Becker et al., 2005; Feldman, 2000; Feldman, 2003; Feldman & Pentland, 2003; Feldman & Rafaeli, 2002; Howard-Grenville, 2005; Nelson & Winter, 1982; Pentland, 1995; Pentland & Feldman, 2005; Pentland & Rueter, 1994; Reynaud, 2005). Organisational routines are "(...) repetitive, recognizable pattern of interdependent actions involving multiple actors" (Feldman & Pentland, 2003:96). A more detailed concretion of organisational routines is facilitated through the differentiation of "ostensive aspects" and "performative aspects" (Feldman & Pentland, 2003; Pentland & Feldman, 2005). "The ostensive aspect is the ideal or schematic form of a routine. It is the abstract, generalized idea of a routine, or the routine in principle. The performative aspect of the routine consists of specific actions, by specific people, in specific places and times. It is the routine in practice" (Feldman & Pentland, 2003:101). The abstract, generalised idea of a routine (ostensive aspect) can equate with underlying rule-systems (Becker, 2005:818; Reynaud, 1996; Reynaud, 2005) or with a grammar (Pentland, 1995; Pentland & Rueter, 1994). The concrete application (performative aspect) is the observable routine. General rules (ostensive aspects) are valid beyond a singular concrete application (performative aspects), even if the concrete application diverges form the general rule.

Organisational routines-approaches focus on the application of collective actions, visible in organisational routines. Rule-systems-approaches (Avadikyan et al., 2001; Beck & Kieser, 2003; Budzinski, 2003; Burr, 1998; March et al., 2000; Mills & Murgatroyd, 1991; Ortmann, 2003; Reynaud, 1996; Reynaud, 2005;

Schulz, 2003; Schulz & Beck, 2002) emphasis rules as mechanisms that govern an organisation's behaviour. Rules underlie organisational routines (see Pentland & Rueter, 1994, with their distinction between routines and a rule-based grammar behind). They are the stabilising structure of routines and, consequently, of the entire organisation.

Organisational rules are defined "(...) as phenomena whose basic characteristic is that of generally controlling, constraining, guiding and defining social action. They exist in both written und unwritten forms; in formal and informal statements; in legalistic and moralistic pronouncements; and yet they do not wholly rely for their efficacy on being known or understood by each and every member of a given situation into which they are applied" (Mills & Murgatroyd, 1991:3-4). The entity of organisational – formal/informal, codified/uncodified, explicit/tacit – rules constitutes the organisation's rule-system. Rules are embedded within the organisational culture (Schein, 1985). They stabilise the organisation's arrangement and enable the reproduction of collective action (ability of replication; Winter & Szulanski, 2001).

On the basis of an intensive review of organisational routines' literature, Becker (2004:660) states: "What sets routines as knowledge repository apart from other kinds of knowledge repositories such as databases and documents, is that routines are widely credited with being able to store tacit knowledge". Rule-systems serve as knowledge repository. Therefore, rule-systems are organisational knowledge and, metaphorically, the organisation's intelligence (March, 1991; Schulz & Beck, 2002:140-141; Tsoukas & Vladimirou, 2001:979-981).

Rules exist independently of concrete individuals. Organisations develop mechanisms to extract individual knowledge from employees (e.g. especially from the founder and from key employees) and embed this knowledge – e.g. organisational rules that allow the accomplishment of various routines – within the organisational culture. Organisational routines and specific task performances serve as mechanisms to generate such generally binding rules. Thus, firms gain independence from individual employees and outlast their withdrawal. New employees learn the organisational routine's underlying rules during the socialisation process (March, 1991; Mills & Murgatroyd, 1991:35-37).

Rules enable and restrict social action (Giddens, 1984) as they possess governing (coordinating) and sense-making functions (Avadikyan et al., 2001; Giddens, 1984). Rules provide knowledge to employees for their task fulfilment in order to enable collective action. Thereby, they reduce complexity, as employees need not to know details behind rules. As rules ever obtain their validity and appropriateness in conjunction with the context of the rule's application, an interpretation of both the rule and the context simultaneously is required (Pentland & Feldman, 2005:797; Reynaud, 1996). Potential sanctions, including group norms, restrict the space for individual behaviour within an organisation (Budzinski, 2003:224-225). „Institutions are generally known systems of interpersonal rules which order repetitive interactions of individual actors and are followed by a majority of them" (Budzinski, 2003:218). Therefore, rules are organisational institutions, that define the corridor of legitimised (accepted) behaviour (e.g. communication, action and decisions) (Budzinski, 2003; Schulz, 2003). They restrict the scope of accepted deviations: the acceptance of rule-breaking.

Rules are concrete expressions of organisational values and norms. Shared values provide unconscious criterion for employees in order to rank various alternatives for action. They are frozen value judgements embedded within the corporate culture that expand into the organisation's norms and rules. Norms are comprehensive regulations for behaviour, as they indicate mindset and behavioural expectations of an organisation or group to an individual employee. As norms are general instructions for action, rules are their concrete specifications for defined contexts. Therefore, rules are only valid within specified contexts for defined employees. Simultaneously, as rules enable a meaningful orientation of individual actions within the organisational context, they facilitate the development of a "collective mind" (Weick & Roberts, 1993). Thus, employees can understand their activities – following existing rules – within an organisational context. This enables them to connect their actions with other employee's action in order to perform organisational routines and to build up an organisational identity. "They (employees; WHG) share an underlying structure that can be captured in the rules of a grammar" (Pentland & Rueter, 1994:504). The solidification of rule-systems cause the organisation's path-dependency as

options for alternative evolutionary paths are increasingly restricted (Schulz & Beck, 2002).

Rules and rule-systems are reproduced and modified through application: both through adherence and deviation. Hence, organisational routines and the underlying rule-systems are subject of a permanent drift (Feldman, 2000; Feldman, 2003; Feldman, 2004; Feldman & Pentland, 2003; Howard-Grenville, 2005) Exceptions and deviations are inherent part of rule-systems. Moreover, conflicts between different rules arise. A breach of existing rules – rule-breaking – enables options for change. Therefore, rule-breaking paves the way for organisational learning and, consequently, for change and innovation (see section 3). However, organisations must contemporaneously prevent rule-breaking in order to secure the existing organisation. Firms must oscillate between the enhancement of rule-breaking in order to stimulate change and the reduction of rule-breaking in order to generate rents from an increase of efficiency. As organisations are "non-trivial machines" (von Foerster), governance of the "ideal" ratio between change and stability is a crucial task, particularly with regard to those mechanisms that elude from immediate observability and control. The concept of dynamic capabilities provides a basis for analysing these mechanisms that determine organisational change and stability.

2.2 Dynamic and Perpetuation Capabilities

Organisational routines serve as basis for the production of goods and services. They can be conceptualized as "zero-level capabilities" (Winter, 2003). Innovation routines are established through organisations in order to generate and implement innovations regarding new products and services in established or new markets or to address existing business activities to new markets. However, the production of innovation is mostly based on routines as well (Güttel, 2006). Organisational and innovation routines can be perceived as zero-level capabilities.

The adaptation and development of operational as well as innovation routines – zero-level capabilities – are governed by dynamic capabilities (Bowman & Ambrosini, 2003; Burmann, 2001; Eisenhardt & Martin, 2000; Schreyögg & Kliesch, 2005; Teece, 2003; Teece et al., 1997; Winter, 2003; Zollo & Winter, 2002). "A dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its

operating routines (i.e. organisational and innovation capabilities; WHG) in pursuit of improved effectiveness" (Zollo & Winter, 2002:340). Dynamic capabilities are routines and are based on rules. By contrast, ad-hoc problem solving is not a dynamic capability, as it exhibits no routinised quality. "Ad hoc problem solving is not routine; in particular, not highly patterned and not repetitious. (...) it typically appears as a response to novel challenges from the environment or other relatively unpredictable events" (Winter, 2003:992-993). Furthermore, structural drifting of routines in the form of implicit acceptance of rule deviation through the absence of sanctions is not a dynamic capability as the change of organisational rules occurs spontaneously.

Dynamic capabilities comprise rules of change and rules associated to rule-breaking and rule-adaptation. By eliminating options for change – otherwise, every impulse for change would be implemented – they stabilise the organisation and enable the development of an organisation's identity. However, up-to-now, the protection of the organisation's stability through dynamic capabilities was widely neglected, even though it was emphasised that dynamic capabilities single out options for change. Nevertheless, to single out means both the acceptance and the rejections of options for renewal. Therefore, it is necessary to enlarge the dynamic capabilities-approach conceptually. This flipside of dynamic capabilities can be defined as perpetuation capabilities, as they inhibit that every impulse for change is effective (comparable to organisational defence mechanism mentioned by Argyris, 1990). Thus, the existing mode of operation is perpetuated. Perpetuation capabilities secure stability and restrict the corridor for the organisation's development as they eliminate options for change.

Dynamic and perpetuation capabilities can be differentiated in first-order and second-order forms (Figure 1). First-order dynamic capabilities (synonym: change routines) govern modifications of operational and innovation routines. First-order perpetuation capabilities (synonym: defence routines) are rules in order to prevent change of operational and innovative routines. In contrast, second-order dynamic capabilities (synonym: transformation routines) influence organisational learning processes and determine the corridor of the organisation's development as options for renewal are accepted and processed. In the form of second-order perpetuation capabilities (synonym: generative routines), they limit the organisation's change behaviour, as options for change are eliminated. Hence, in every organisation a

specific ratio between dynamic and perpetuation capabilities exists. The distribution of these accelerating and restricting forces govern the firm's development. Dynamic/perpetuation capabilities are embedded in different levels of the organisational culture (Luhmann, 1995; Schein, 1985). First-order dynamic/perpetuation capabilities are part of the organisation's surface structure. These rules, mostly of explicit quality, are available for cognitions and rational discussion as they are at the manifest level. In contrast, second-order dynamic/perpetuation capabilities are part of the organisation's depth structure (latent level). These tacit rules comprise normative aspects and elude of formal decision-making. Moreover, norms are fare more resistant to change than cognitions (Luhmann, 1995).

Figure 1: Levels of Organisational Learning und Non-learning

	Dynamic Capabilities	**Perpetuation Capabilities**
First-order (Surface structure / manifest level)	**Change routines**: Optimisation of operational and innovation processes	**Defence routines**: Prevention of change of operational and innovation processes (Cognitive aspects)
Second-order (Depth structure / latent level)	**Transformation routines**: Change of the organisation's change behaviour	**Generative routines**: Limitation of the organisation's change behaviour (Normative aspects)

Eisenhardt & Martin (2000) emphasise the characteristic of dynamic capabilities in relation to market dynamics. In highly volatile markets, only a few "simple rules" (Eisenhardt & Sull, 2001) govern the firm's development. Thus, firms can adapt and reconfigure their organisational capabilities quickly in order to cope with market dynamics. In contrast, in moderately dynamic markets, a distinctive and complex rule-system exists. Thus, options for change and innovation are eliminated and strategic flexibility is limited. However, stability and reliability is

functional in cases where highly repetitive and standardised performance is essential (e.g. in public administrations).

3 Innovation, Change, and Rule-breaking

Innovation and change are based on new knowledge or existing knowledge within new contexts (creation and recombination). Invention is the idea for innovation and change. The term innovation characterises the development of new products/services or markets. However, innovations often need at least a minimal change (optimisation) of the existing organisation. Similarly, optimisations of processes and structures can pave the way for innovations. The term change is used for modifications that concern the organisation's structures and processes (including technologies). Transformation is a variety of change. It concerns situations where the organisational culture and, consequently, the entire organisation or substantial parts of it are object of change.

The generation of inventions as options for innovation and change are based on existing capabilities. It is the initial point for modifications or mutations of rule-systems as new rules might emerge or existing rules may be broken (section 3.1). The extent that these options for change are processed depends on first- and second-order dynamic/perpetuation capabilities (section 3.2). Therefore, firms oscillate between stability and change as they permit and limit organisational learning (section 3.3)

3.1 Generation of Rule-breaking Options

The initial point for any innovation and change is the generation of an idea: invention. This can be done within designed contexts or it can happen unintentionally ("structural drift") through the application of routines, described as tension between "ostensive" and "performative" aspects of routines (Feldman, 2003; Feldman & Pentland, 2003; Pentland & Feldman, 2005).

The generation of inventions is an achievement of existing capabilities. It results from an organisation's ability to enable environmental observations and self-reflection (Zollo & Winter, 2002:343). Internal criteria of relevance influence the selection of impulses for novelties from the external environment or through reflection of the organisation's existing mode of operation (e.g. structures, processes, culture). Therefore, organisations establish contexts to generate new

ideas in a systematic manner (e.g. R&D departments, continuous optimisation processes). Although, it is not possible to plan the creation of new ideas directly.

Environmental observations serve for the generation of inventions. Therefore, search routines are necessary in order to enable "opportunity recognition" (Alvarez & Busenitz, 2001:756; e.g. in the form of market observations and analysis as well as the integration of customers into product development processes). These routines can be integrated and, therefore, institutionalised into strategy development processes. Furthermore, the employee's creative skills can accomplish inventions.

Inventions are also generated through self-reflection of the organisation's mode of operation. Existing activities and processes are questioned in order to identify options for optimisations. In part, benchmarking could provide a basis, but simple replication of existing solutions of other firms, especially in the same industry, will not facilitate the generation of idiosyncratic competitive advantage (new-institutional theory provides convincing descriptions of mechanism of best-practice diffusion; DiMaggio & Powell, 1991; Scott, 1995). Inventions can also be generated within cooperation with external knowledge producers (e.g. R&D networks) (Campbell & Güttel, 2005; Gibbons et al., 1994) or can be acquired from external consultants and through M&A. However, the recognition of inventions from employees or external sources depends on the organisation's absorptive capacity (Cohen & Levinthal, 1990; Zahra & George, 2002). If an invention as an option for rule-breaking is generated, both from planned activities and through structural drift, first- and second-order dynamic/perpetuation capabilities are crucial regarding the organisation's dealing with it.

3.2 Dealing with Rule-breaking

Potentials for rule-breaking emerge from inventions or through "structural drifts" (microscopic change; Tsoukas & Chia, 2002:580) of existing rule-systems. Consequently, new rules as well as deviations from existing rules emerge permanently and, thus, challenge existing ones. Rule-breaking happens if existing rules are replaced or become obsolete by new ones. Two questions arise from the appearance of rule deviations. The first question regards the extent to what deviant rules are in conflict with existing ones and entire rule-systems: does the new rule reside within the corridor of accepted deviation or not? The corridor is

restricted by rules of first- and second-order perpetuation capabilities. The second question concerns the level where rule-breaking happens: does the rule-conflict emerge on the level of operational or innovation routines or are rules of first- or second-order dynamic/perpetuation capabilities challenged? Accordingly, the level of learning and change is observable and definable dependent on routines that are affected by rule-breaking.

Deviant rules can emerge within or beyond the corridor of accepted rule deviations. The latter is restricted by rules of defence and generative routines (first- and second-order perpetuation capabilities). Thus, deviant rules within the corridor of acceptance can co-exist as long as no critical incidence arises. “The local initiatives, improvisations, and modifications individuals engage in may go unrecognized; opportunities may not be officially taken up, imaginative extensions may not break through existing organizational culture – in short, local adaptations may never become institutionalized” (Tsoukas & Chia, 2002:580). Existing rules can still claim validity or, otherwise, may be perceived as obsolete or will be suspended. Moreover, the absence of reactions to rule-breaking can protect the existing rule. The general validity of a certain rule should not be undermined through the particular case of their violation (Ortmann, 2003:33). The continued ignorance of existing rules cause their oblivion or “unlearning” (Hedberg, 1981). Therefore, it is not longer part of the organisation’s rule-system and opens up options for the sustainable establishment of new rules.

However, if ignorance does not bring about a solution whether the new rule or the existent one is valid and a critical incidence happens, a formal (regarding explicit rules), but mostly informal (regarding tacit rules) decision process proceeds (Budzinski, 2003:227). This process can associate with conflicts as rules and rule settings are sources of power (Giddens, 1984). Thereafter, it should be clear which rule is in effect and which alternative rules are marked as irregularity. The old rule can be confirmed as valid, it can be modified (e.g. by integration of parts of the alternative rule) or the new rule comes in effect.

From a hierarchical perspective, organisations possess specific change rules in order to facilitate continuous adaptation and renewal of rule-systems. These first-order dynamic capabilities concern such as R&D, restructuring, reengineering, and post-merger activities (Zollo & Winter, 2002). They enable routinised

reactions to typical change necessities (Winter, 2003:994). Thus, these change rules enable organisations to modify its organisational and innovation routines without discussing the mode of change in every case, where it is perceived as required. Change rules are ex-ante accepted rules for change occasions and thereby a form of complexity reduction. Contrarily, defence routines (first-order perpetuation capabilities) restrict the corridor of accepted deviations of operational and innovation routines. However, these change/defence rules change in the same mode as rules of zero-level capabilities develop.

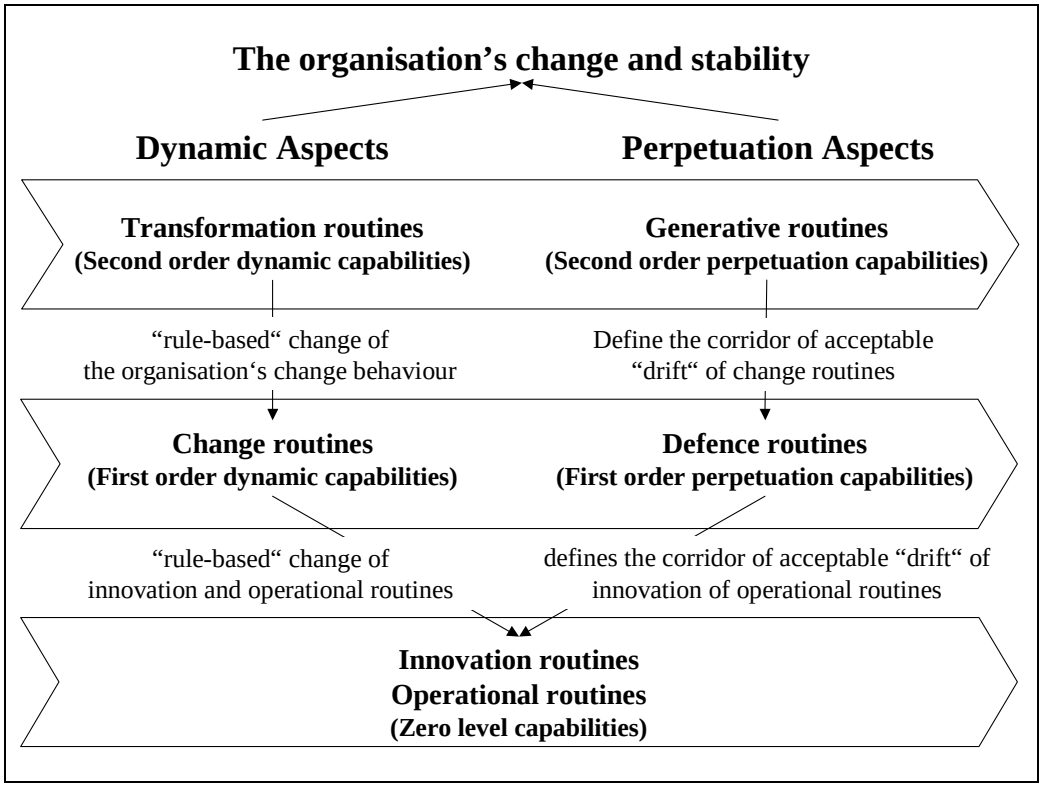
Conflicts of opposed operational or innovation rules as well as structural drifting change/defence rules can challenge basic assumptions of an organisation's rule-system. Consequently, the organisation's depth structure in the form of transformation and generative rules becomes object of transformation. The mode of rule change is similar to those described above, but the intensity of conflict is stronger as the organisation's basic values and norms are touched, by which transformation/generative rules are laden. Generative rules (second-order perpetuation capabilities) provide mechanism in order to prevent fundamental transformations of organisations. These rules derive its origin from the organisation's genesis and serve as a function in order to stabilise the emerging structures. Concurrently, systematic learning mechanisms emerge that govern the organisation's development. These second-order dynamic capabilities enable the development of operational and innovation routines. Furthermore, transformation rules exhibit the potential to modify change and defence routines in order to readjust the organisation's change behaviour (Winter, 2003; Zollo & Winter, 2002). Consequently, the organisation's behaviour is characterised by the tension between transformation and generative rules. It depends on the concrete characteristic of the ratio between second-order dynamic and perpetuation capabilities whether the break of rules is permitted or inhibited.

3.3 Oscillation Between Stability and Change

Organisations oscillate between stability and change. Exploration and exploitation – as different forms of organisational development and learning – are essential in order to generate options for renewal as well as to optimise existing processes and structures (Birkinshaw & Gibson, 2004; Gibson & Birkinshaw, 2004; March, 1991). In a specific time frame, organisations permit a certain extent of change and development and limit change intentions beyond. This results in an

idiosyncratic path development of organisations with distinguishable evolutionary stages. Transformation/perpetuation capabilities permit and limit the organisation's capacity for learning. Moreover, different levels of organisational learning and change can be distinguished regarding the impact of rule-breaking on an organisational rule-system (Figure 2).

Figure 2: Capabilities for Change and Stability



Transformation and generative rules have most impact on the organisation's development. They define the extent of accepted and excluded modifications of other routines and their underlying rule-systems. In exceptional cases, the ratio between second-order dynamic and perpetuation capabilities can alter. This means that a different form of development emerges as organisational learning mechanisms change. However, it depends on the dynamic/perpetuation capabilities' re-configuration whether change and renewal is accelerated and restricted. These paradigmatic transformations (various concepts exist concerning changes within the organisation's depth structure: e.g. double-loop learning; Argyris & Schön, 1978; second-order learning; Lant & Mezias, 1992; second-order change; Levy & Merry, 1986; exploration; March, 1991) are not rule guided. It follows ad-hoc problem solving mechanisms, as no routines can be build up by organisations for these exceptional cases (Winter, 2003). Second-

order learning "(…) is characterized by the search for and exploration of alternative rules, technologies, goals, and purposes, rather than merely learning how to perform current routines more efficiently. Second-order learning results from the realization that certain experiences cannot be interpreted within the current belief system (…) or organizational paradigm" (Lant & Mezias, 1992:49). The term mutation is used to describe changes of rules of an organisation's depth structure – transformation/generative rules – because, subsequently, this change will affect the rules of the surface structure of the organisation (i.e. organisational, change and innovation rules). Mutations change the ratio between accelerating and restricting forces within an organisation's depth structure. Therefore, organisational learning appears when transformation/generative rules are broken and, consequently, the ratio between dynamic/perpetuation capabilities is altered (methods of the objective hermeneutics provide ways to re-construct rule-systems; Titscher et al., 2000).

In contrast, the term modification characterises changes within the surface structure of an organisation concerning operational, innovation or change/defence routines (single-loop learning; Argyris & Schön, 1978; first-order learning; Lant & Mezias, 1992; first-order change; Levy & Merry, 1986; exploitation; March, 1991). First-order learning is defined as "(…) a routine, incremental, conservative process that serves to maintain stable relations and sustain existing rules" (Lant & Mezias, 1992:48-49). The re-interpretation as well as the re-application of operational, innovation and change rules lead to modifications (first-order change) (incremental change; Feldman, 2004). First-order organisational learning occurs and becomes observable in cases where operational, innovation or change rules are broken (e.g. structural or process-related re-design). These modifications happen within the corridor that is restricted by transformation/generative rules (depth structure).

If firms aspire to leave existing path-dependent developments, a second-order change is essential. The principles of „creative destruction" (Schumpeter, 1934) are possessed within organisations. Through an alteration of the organisation's ratio between dynamic and perpetuation aspect, second-order learning is enhanced. Thus, in the majority of cases, the organisation's ability for change and innovation is increased in order to expand variability and variety. Therefore, rule-breaking is facilitated. Subsequently, the firm's capacity for innovations is

expanded. However, in some cases, the organisation's stabilising forces in the form of perpetuation capabilities are enhanced. Thus, the organisation's redundancy is increased in order to facilitate routinisation, standardisation or the utilisation of synergies. Consequently, rule-breaking is prevented and the firm's potential for innovations is narrowed. Organisations must find a ratio between accelerating and restricting forces in order to cope with competitive dynamics. In the subsequent section, different forms of organisational design are analysed regarding their potential to enhance or limit rule-breaking.

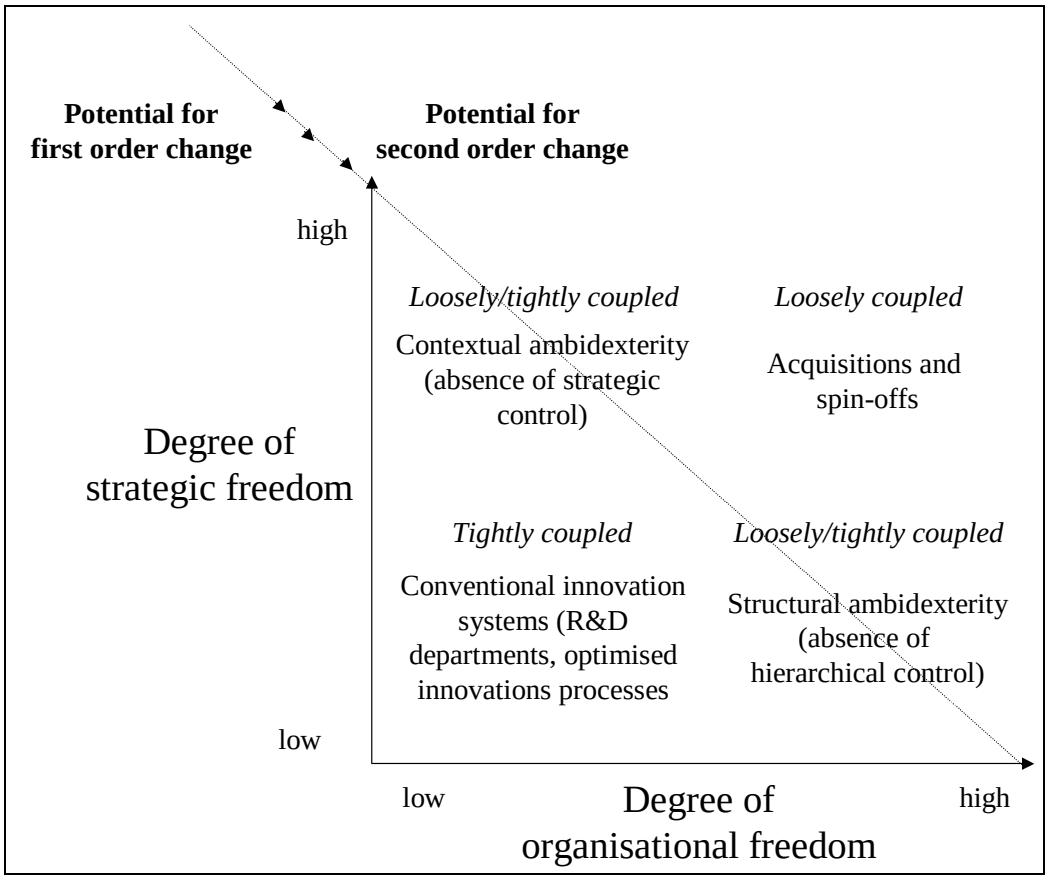
4 Contexts for Rule-breaking

The extent of potential rule-breaking can be facilitated or inhibited through organisational design. In management practice, various strategies exist in order to stimulate innovation and change. Proposals from organisational literature concerning organisational design can be classified according to the degree of strategic and organisational freedom (Figure 3).

Organisational freedom is determined by the formal organisation – i.e. based on formal rules – regarding the subunit's extent of integration into the entire organisation. Organisational freedom is high – loose hierarchical control mechanisms – if there are structures that enable alternative developments. In contrast, organisational freedom is low – tight hierarchical control mechanisms – if there is an intense integration into and dependence from the entire organisation, typically defined through hierarchical control mechanisms (e.g. conventional R&D departments).

Strategic freedom depends on the degree of a subunit's integration into the strategic planning process of the entire organisation. Strategic freedom is high, if subunits are not committed to strategic guidelines and, therefore, dispose of opportunities for individual strategic planning. In contrast, strategic freedom is low if strategic decisions are dependent on strategic plans of subordinated entities.

Figure 3: Contexts for Rule-breaking



4.1 Loosely Coupled Systems: Acquisitions and Spin-offs

Acquisitions of firms, whose strategic and organisational independency is retained, as well as spin-offs are the most important option to facilitate substantial rule-breaking. Acquisitions are characterised by the collision of two existing rule-systems. During post-merger integration, the acquirer's rule-system comes into conflict with the rule-system of the acquired firm. This tensions concern all rule-system's levels including first and second-order dynamic/perpetuation capabilities. How far the conflicting state is maintained depends on the degree of integration. In many cases, a complete – strategic as well as organisational – integration of the acquired firm into the acquirer's existing organisation will result in the destruction of the acquired firm's existing routines (see the Banc-One-example provided by Szulanski, 2000).

Spin-offs are completely outsourced subunits that are provided with strategic and organisational freedom in order to elude from hierarchical control. Over the course of time, an alternative development of the subunit's rule-system in comparison to them of the entire organisation is presumable, as the perpetuation capabilities of the entire organisation loose effectiveness.

However, questions remain whether the newly developed rules of spin-offs or acquired rule-systems impact on the entire organisation. Therefore, the handling of conflicts resulting from contradicting rules is crucial. Particularly, substantial impulses for change and innovation that are out of the entire firm's frame of reference or contrary to the transformation/perpetuation rules are concerned, as they pose the existing mode of operation into question (e.g. the existing business model and the values, norms and rule-systems embedded into the organisational culture). Therefore, substantial potential for intense conflicts arise. Furthermore, there is no immediate way for knowledge transfer – e.g. favourable routines with underlying rule-systems – from one organisation to another one as resource-based research shows (Szulanski, 1996). Consequently, acquisitions and spin-offs dispose of substantial potential for rule-breaking. However, the entire organisation's rule-system decides on the mode of processing regarding these impulses for change and transformation.

4.2 Loosely/Tightly Coupled Systems: Contextual Ambidexterity

Loosely/tightly coupled innovation systems are embedded within the entire firm, but they dispose of strategic freedom for innovative activities. In particular, these subunits are characterised by cultural diversity (in regard to values and norms of the organisational culture), as it is described by Birkinshaw & Gibson (2004) and Gibson & Birkinshaw (2004) with their concept of contextual ambidexterity. It is "(…) an organization's capacity to simultaneously achieve alignment and adaptability within a single business unit, that it is best achieved not through structural, task or temporal separation, but by building a business-unit context that encourages individuals to make their own judgements as to how best divide their time between the conflicting demands for alignment and adaptability" (Gibson & Birkinshaw, 2004:211). Therefore, the organisation's rule-system must permit employees a great variety of alternatives (e.g. by definition of a few but obligatory "simple rules"; Eisenhardt & Sull, 2001). Thus, the design of organisational control mechanisms is critical as rule-breaking is facilitated and restricted concurrently.

Loosely/tightly coupled innovation systems dispose of potential for rule-breaking in regard to operational and innovation routines as well as to change routines. A broad scope of accepted rule deviation is associated with cultural diversity provided by contextual ambidexterity. However, perpetuation capabilities of the

entire organisation are in effect and eliminate options for transformation as they restrict the corridor of accepted rule-breaking just as they come from tight coupled organisational units. Otherwise, the entire organisation would drift apart and disintegrate.

4.3 Loosely/Tightly coupled Systems: Structural Ambidexterity

Within an existing firm, organisational units or individual project groups can assign freedom from hierarchical control. within a defined strategic corridor of the entire firm. This is another form of loosely/tightly coupled systems as hierarchical control is low, but subunits – e.g. innovation labs – are dependent on the entire organisation's strategic decisions. Birkinshaw & Gibson (2004) and Gibson & Birkinshaw (2004) call it structural ambidexterity in order to highlight the case where, within an entire organisation, a few subunits dispose of space for alternative developments – also in regard to their rule-systems – through the absence of tight hierarchical control. However, Birkinshaw & Gibson (2004:49) emphasise: "Structural separation is necessary, the argument goes, because the two sets of activities are so dramatically different that they cannot effectively coexist". Thus, conflicts through the differentiation of diverse rule-systems emerge comparably to loosely coupled systems. In particular, strategic opportunities might be limited in order to use innovations and change options generated by the subunit.

However, change processes concerning the development of the organisational culture (Cummings & Worley, 1993) follow the logic of structural ambidexterity. The generation of alternative cultural values and norms requires an establishment of project groups as structural nucleus for rule-breaking regarding first- and second-order transformation/perpetuation capabilities. In this case, temporary contexts for second-order organisational learning are established to facilitate rule-breaking. The handling of conflicts resulting from the tension between the entire organisation's rule-system and the emerging new one is critical. In this context, the ratio of dynamic and perpetuation aspects can be affected and (ad-hoc) learning on the organisation's depth structure is possible.

4.4 Tight-Coupled Systems: Conventional Innovation Systems

Tight-coupled innovation systems include conventional R&D departments, optimisation efforts of existing innovation processes and individual employees as

entrepreneurs. All these arrangements attempt to avoid rule-breaking by limiting organisational and strategic freedom. In principle, they are counterproductive in regard to the facilitation of innovation and change as they restrict the scope of the organisation's development. Certainly, optimisation efforts regarding existing innovation processes are essential to standardise and routinise these activities (exploitation mode; March, 1991). However, these optimisations are related to zero-level-capabilities, whereas first- and second-order capabilities are unconcerned. Similarly, R&D departments provide a basis for routinised development of innovations within an defined corridor of accepted rule deviations. The impact of individual employees, whether they act as "entrepreneurs" or not, on the organisation's change behaviour is limited as well. They are socialised within the existing organisational culture (March, 1991) and, consequently, their potential to change cultural values, norms or rule-systems is restricted by defence and generative rules. However, individual employees can alter routines and underlying rules whilst performing it. These variations of performative aspects can penetrate ostensive aspects of organisational routines (Feldman, 2000; Feldman, 2003; Feldman, 2004; Feldman & Pentland, 2003; Howard-Grenville, 2005) and change operational and innovation rules. However, these modifications concern rules within the scope of accepted deviations restricted by defence and generative routines. However, the ratio between dynamic and perpetuation aspects of the organisation's depth structure is not object of change and transformation.

5 Conclusion

Concepts of organisational routines and dynamic capabilities offer analytical explanations for organisational dynamics, change, and learning. However, explaining and integrative models are missing in regard to the emergence and evolution of organisational and dynamic capabilities. This paper picks up this gap by providing a conceptual model of organisational learning in the terms of rule-breaking. Concurrently, organisational non-learning and resistance to change is analysed.

The paper on hand synthesise concepts of organisational routines, rule-systems and dynamic capabilities. Two extensions are carried out in order to develop the conceptual model. First, organisational rules are conceptualised as the stabilising

structure of organisational routines. Rule-systems – consisting of explicit and tacit rules – are perceived as a hierarchy of organisational rules. Therefore, the model developed within this paper, integrates different categories of rules (e.g. dynamic capabilities as change and transformations rules) that are ordered hierarchically. Second, dynamic capabilities are seen as routines facilitating organisational change and transformation. However, the firm's ability for change is limited and research lack on explanations of resistance to change intentions and to non-learning behaviour. Dynamic capabilities as learning mechanisms and their counterpart, perpetuation capabilities as non-learning mechanisms (defence and generative routines), are integrated in the model in order to explain resistance to change. Consequently, they inhibit rule-breaking.

Options for rule-breaking are generated intentionally – resulting from environmental observation and reflection of the organisation's mode of operation – or emerge through a structural drift of existing rules underlying operational and innovation routines. Rule-breaking happens if existing rules are broken by new ones. It depends on the existing corridor of accepted rule deviation how organisations deal with rule-breaking. According to the rule-system's hierarchy, the corridor for rule-breaking of operational and innovation rules (zero-level capabilities) is restricted by change/defence routines (first-level capabilities). Moreover, transformation/generative routines (second-level capabilities) define the corridor for change/defence rules in addition.

Organisations oscillate between stability and change. Accelerating and restricting forces are processed in order to govern the organisation's development. The ratio between these forces characterises the extent of organisational dynamics. First-order learning and change are common descriptions for modifications on the organisation's surface structure concerning operational, innovation and change routines. Second-order learning and change happens when transformation/generative rules and the ratio between them are object of change. Then a mutation of the organisation's rule-system occurs as the transformation of the depth structure impacts on the entire organisation's change and innovation behaviour significantly. Organisational learning in terms of rule-breaking is observable on rule-systems. As the latter represents organisational knowledge, their modification or mutation indicate the extent of organisational learning.

Different forms of organisational design facilitate or prevent rule-breaking. In loosely coupled systems, where organisational and strategic freedom is high, the development of alternative rule-systems is probable (e.g. acquisitions, spin-offs). Consequently, the potential for substantial rule-breaking in the form of second-order learning is high. Loosely/tightly coupled innovation systems based on simple rules core , innovation labs and project groups within organisational cultural development processes (in terms of structural ambidexterity) dispose of an immediate position in regard to their potential of substantial (high-order) rule-breaking. Only a very limited potential for second-order change is associated with tightly coupled innovation systems (e.g. conventional R&D departments, optimization efforts regarding innovation processes, individuals as entrepreneurs). From a rule-breaking perspective, the more independent organisational units from an entire organisation are, the higher the probability that an independent rule-system emerges and, subsequently, the higher the potential for tensions between these entities regarding opposed rule-systems. However, these tensions and conflicts pave the way for second-order learning.

Further research should concern empirical studies referring the impact of dynamic and perpetuation capabilities on organisational change and learning processes. In particular, substantial innovation processes (e.g. business-model innovations), organisational cultural change processes and post-merger integration processes are suitable to analyse change on the second-order dynamic/perpetuation capabilities' level. Thus, the stabilising core as well as the dynamic forces of organisations are focus of attention. As organisational knowledge is concerned, it could be analysed in terms of rule-breaking and rule-preservation (organisational defence).

6 Bibliography

Alvarez, S. A., & Busenitz, L. W. 2001. The Entrepreneurship of Resource-Based Theory. ***Journal of Management***, 27: 755-775.

Argyris, C. 1990. ***Overcoming Organizational Defenses: Facilitating Organizational Learning***. Needham (MA).

Argyris, C., & Schön, D. A. 1978. ***Organizational Learning: A Theory of Action Perspective***. Reading (MA).

Avadikyan, A., Llerena, P., Matt, M., Rozan, A., & Wolff, S. 2001. Organizational Rules, Codification and Knowledge Creation in Inter-Organizational Cooperative Agreements. ***Research Policy***, 30: 1443-1458.

Beck, N., & Kieser, A. 2003. The Complexity of Rule Systems, Experience and Organizational Learning. ***Organization Studies***, 25(5): 793-814.

Becker, M. C. 2004. Organizational Routines: A Review of the Literature. ***Industrial and Corporate Change***, 13(4): 643-677.

Becker, M. C. 2005. A Framework for Applying Organizational Routines in Empirical Research: Linking Antecedants, Characteristics and Performance Outcomes of Recurrent Interaction Patterns. ***Industrial and Corporate Change***, 14(5): 817-846.

Becker, M. C., Lazaric, N., Nelson, R. R., & Winter, S. G. 2005. Applying Organizational Routines in Understanding Organizational Change. ***Industrial and Corporate Change***, 14(5): 775-791.

Birkinshaw, J., & Gibson, C. B. 2004. Building Ambidexterity into an Organization. ***MIT Sloan Management Review***, 25(4): 47-55.

Bowman, C., & Ambrosini, V. 2003. How the Resource-Based and the Dynamic Capability Views of the Firm Inform Corporate-Level Strategy. ***British Journal of Management***, 14: 289-303.

Budzinski, O. 2003. Cognitive Rules, Institutions, and Competition. ***Constitutional Political Economy***, 14: 213-233.

Burmann, C. 2001. Strategische Flexibilität Und Strategiewechsel in Turbulenten Märkten. ***Die Betriebswirtschaft***, 61(2): 169-188.

Burr, W. 1998. Organisation Durch Regeln. ***Die Betriebswirtschaft***, 58: 312-331.

Campbell, D. F. J., & Güttel, W. H. 2005. Knowledge Production of Universities and Firms: Research Networks and the "Scientification" of Business R&D. ***International Journal of Technology Management***, 31: 152-175.

Cohen, W. M., & Levinthal, D. A. 1990. Absorptive Capacity: A New Perspective on Learning and Innovation. ***Administrative Science Quarterly***, 15: 128-152.

Cummings, T. G., & Worley, C. G. 1993. ***Organization Development and Change*** (5th ed.). St. Paul.

DiMaggio, P. J., & Powell, W. W. 1991. The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. In W. W. Powell, & P. J. DiMaggio (Eds.), ***The New Institutionalism in Organizational Analysis***. Chicago (IL): 63-82.

Eisenhardt, K. M., & Martin, J. A. 2000. Dynamic Capabilities: What Are They? ***Strategic Management Journal***, 21: 1105-1121.

Eisenhardt, K. M., & Sull, D. N. 2001. Strategy as Simple Rules. ***Harvard Business Review*** (1): 107-116.

Feldman, M. S. 2000. Organizational Routines as Source of Continuous Change. ***Organization Science***, 11: 611-629.

Feldman, M. S. 2003. A Performative Perspecitve on Stability and Change in Organizational Routines. ***Industrial and Corporate Change***, 12(4): 727-752.

Feldman, M. S. 2004. Resources in Emerging Structures and Processes of Change. ***Organization Science***, 15: 295-309.

Feldman, M. S., & Pentland, B. T. 2003. Reconceptualizing Organizational Routines as a Source of Flexibility and Change. ***Administrative Science Quarterly***, 48: 94-118.

Feldman, M. S., & Rafaeli, A. 2002. Organizational Routines as Sources of Connections and Understandings. ***Journal of Management Studies***, 39(3): 309-331.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. 1994. ***The New Production of Knowledge. The Dynamics of Science and Research in Contemporary Societies***. London.

Gibson, C. B., & Birkinshaw, J. 2004. The Antecedents, Consequences, and Mediating Role of Organizational Ambidexterity. ***Academy of Management Journal***, 47(2): 209-226.

Giddens, A. 1984. ***The Constitution of Society***. Berkeley.

Güttel, W. H. 2006. Knowledge Production: Competence Development and Innovation - between Invention and Routine. In E. Carayannis, & D. F. J. Campbell (Eds.), ***Knowledge Creation, Diffusion and Use in Innovation Networks & Clusters: A Comparative Systems Approach across the U.S., Europe and Asia***. Westpoint, London: 52-66.

Hedberg, B. 1981. How Organizations Learn and Unlearn. In P. C. Nystrom, & W. H. Starbuck (Eds.), ***Handbook of Organizational Design***, Vol. 1 (Adapting Organizations to Their Environment). Oxford: 3-27.

Howard-Grenville, J. A. 2005. The Persistance of Flexible Organizational Routines: The Role of Agency and Organizational Context. ***Organization Science***, 16(6): 618-636.

Lant, T., & Mezias, S. J. 1992. An Organizational Learning Model of Convergence and Reorientation. ***Organization Science***, 3(1): 47-71.

Levy, A., & Merry, U. 1986. ***Organizational Transformation***. New York etc.

Luhmann, N. 1995. ***Social Systems***. Stanford: Stanford University Press.

March, J. G. 1991. Exploration and Exploitation in Organizational Learning. ***Organization Science***, 2(1): 71-87.

March, J. G., Schulz, M., & Zhou, X. 2000. ***The Dynamics of Rules: Change in Written Organizational Codes***. Stanford (CA).

Mills, A. J., & Murgatroyd, S. J. 1991. ***Organizational Rules. A Framework for Understanding Organizational Action***. Philadelphia.

Nelson, R. R., & Winter, S. G. 1982. ***An Evolutionary Theory of Economic Change***. Cambridge (MA), London.

Ortmann, G. 2003. ***Regel Und Ausnahme. Paradoxien Sozialer Ordnung***. Frankfurt/Main.

Pentland, B. T. 1995. Grammatical Model of Organizational Processes. ***Organization Science***, 6: 541-556.

Pentland, B. T., & Feldman, M. S. 2005. Organizational Routines as a Unit of Analysis. ***Industrial and Corporate Change***, 14(5): 793-815.

Pentland, B. T., & Rueter, H. H. 1994. Organizational Routines as Grammers of Action. ***Administrative Science Quarterly***, 39: 484-510.

Reynaud, B. 1996. Types of Rules, Interpretation and Collective Dynamics: Reflections on the Introduction of a Salary Rule in a Maintenance Workshop. ***Industrial and Corporate Change***, 5(3): 699-721.

Reynaud, B. 2005. The Void and the Heart of Rules: Routines in the Context of Rule-Following. The Case of the Paris Metro Workshop. ***Industrial and Corporate Change***, 14(5): 847-871.

Roberts, P. W., & Eisenhardt, K. M. 2003. Austrian Insights on Strategic Organization: From Market Insights to Implications for Firms. ***Strategic Organization***, 1: 345-352.

Schein, E. H. 1985. ***Organizational Culture and Leadership: A Dynamic View***. San Francisco.

Schreyögg, G., & Kliesch, M. 2005. Dynamic Capabilities and the Development of Organizational Competencies: Freie Universität Berlin, Institut für Management (Working Paper).

Schulz, M. 2003. Impermanent Institutionalization: The Duration Dependence of Organizational Rule Changes. ***Industrial and Corporate Change***, 12: 1077-1098.

Schulz, M., & Beck, N. 2002. Die Entwicklung Organisationaler Regeln Im Zeitverlauf. ***Kölner Zeitschrift für Soziologie und Sozialpsychologie***, 42: 119-150.

Schumpeter, J. A. 1934. ***Theorie Der Wirtschaftlichen Entwicklung***. Berlin.

Scott, W. R. 1995. ***Institutions and Organizations***. Thousand Oaks (CA).

Szulanski, G. 1996. Exploring Internal Stickiness: Imbediments to the Transfer of Best Practice within the Firm. ***Strategic Management Journal***, 17(1): 27-43.

Szulanski, G. 2000. Appropriability and the Challenge of Scope: Banc One Routinizes Replication. In G. Dosi, R. R. Nelson, & S. G. Winter (Eds.), ***The Nature and Dynamics of Organizational Capabilities***. Oxford, New York: 69-98.

Teece, D. J. 2003. Explicating Dynamic Capabilities: Asset Selection, Coordination, and Entrepreneurship in Strategic Management Theory: University of California, Berkeley (Working Paper).

Teece, D. J., Pisano, G., & Shuen, A. 1997. Dynamic Capabilities and Strategic Management. ***Strategic Management Journal***, 18: 509-533.

Titscher, S., Meyer, M., Wodak, R., & Vetter, E. 2000. ***Methods of Text and Discourse Analysis***. London, Thousand Oaks, New Delhi: Sage.

Tsoukas, H., & Chia, R. 2002. On Organizational Becoming: Rethinking Organizational Change. ***Organization Science***, 13(5): 567-582.

Tsoukas, H., & Vladimirou, E. 2001. What Is Organizational Knowledge? ***Journal of Management Studies***, 38: 973-993.

Weick, K. E., & Roberts, K. H. 1993. Collective Mind in Organizations: Heedful Interrelating on Flight Decks. ***Administrative Science Quarterly***, 38: 357-381.

Winter, S. G. 2000. The Satisficing Principle in Capability Learning. ***Strategic Management Journal***, 21: 981-996.

Winter, S. G. 2003. Understanding Dynamic Capabilities. ***Strategic Management Journal***, 24: 991-995.

Winter, S. G., & Szulanski, G. 2001. Replication as Strategy. ***Organization Science***, 6: 730-743.

Zahra, S., & George, G. 2002. Absorptive Capacity: A Review, Reconceptualization, and Extention. ***Academy of Management Review***, 27: 185-203.

Zollo, M., & Winter, S. G. 2002. Deliberate Learning and the Evolution of Dynamic Capabilities. ***Organization Science***, 13: 339-351.