Chapter 6
Organisations, Change, and Innovation

The body of literature on organisations, change, and innovation is vast and widely ramified. Books and journal articles have been written on almost all conceivable aspects of the topic, and underlying theories are heterogeneous and sometimes even conflicting (Scherer 2002, 2). Hence, the following introduction cannot be exhaustive, nor can it capture every nuance of the various theories I will touch upon. Rather, I will provide a bird's eye view on some key concepts to set the stage and select a few works that I consider useful for the development and application of a management approach to Green Business Model Transformation. By all means, the theories, concepts and frameworks discussed in this chapter are not the only ones potentially suitable for this task and should therefore be considered a suggestion rather than a prescription.

6.1 Organisation Theory

Because of the above-mentioned heterogeneity and the fact that various other disciplines feed into the body of organisation theory literature, a common classification of the various schools – let alone the description of a *unified theory of organisations* seems unrealistic (Scherer 2002). Scott (2002) proposes to view organisations through a five-element model that includes its social structure, participants, goals, technology, and environment. Moreover, he structures organisational studies along three main views of organisations: as *rational*, *natural*, and *open systems*. Scott's classification by type of system view is useful to complement the systems perspective that is integral to the business model concept and will thus also be used to structure the following overview on some of the most influential academic schools.

6.1.1 Organisations as Rational Systems

The *rational systems* view was the first scientific basis to managing organisations in a structured way. It followed a mechanistic understanding of organisations and their constituents that propagated the improvement of their functioning by applying certain "scientific" principles.

The following definition of organisations is compatible with the rational systems view:

> *"Organizations are collectivities oriented to the pursuit of relatively specific goals and exhibiting relatively highly formalized social structures."*   (Scott 1992, 23)

Under the rational systems view Scott (1992, 34ff.) lists the classic theories of Taylor, Fayol, Weber, and Simon that are briefly outlined in the following.

Taylor is regarded as the founding father of scientific management. In his monograph "The Principles of Scientific Management" he propagates to replace the prevalent – in Taylor's view amateurish – management practices that use rules of thumb with scientific methods. Taylor regards organisations as big machines that can be run much more efficiently through management that is a "true science, resting upon clearly defined laws, rules, and principles" (Taylor 1911, 7).

Fayol's theory of business administration aims to provide principles that can serve for the purpose of rationalisation of the firm. Like Taylor, Fayol propagates a very formal approach to managing organisations. Fayol developed various formal typologies on business activities and entities, including five primary functions of management (planning, organizing, commanding, coordinating, and controlling), and 14 principles of administration (ranging from division of work to esprit de corps) (Fayol 1929). In contrast to Taylor, he suggests a top-down approach through coordination and specialisation (Scott 1992, 36).

Weber's contemporaneous but independent theory of bureaucracy represents only one part in his comprehensive, posthumously published work "Wirtschaft und Gesellschaft" ("Economy and Society") (Weber 2002, first published 1921/22). It includes a description of *ideal-type* (i.e., pure) bureaucracies that he considered to be not necessarily likable, but more rational and efficient than other (older) forms of organisations which rely on charismatic or traditional rather than legal authority (Scott 1992, 38ff.).

The ideas described above have greatly increased efficiency of economic activity and remain influential to this day. At the same time, however, the focus on decomposition and specialisation hinders firms to address sustainability issues holistically.

Herbert Simon is the founder of the theory of administrative behaviour (Simon 1947) and can be considered the pioneer of the modern understanding of organisational decision-making. Simon was an outspoken critic of the earlier attempts of administrative theorists to define general management principles. He rejected the unrealistic assumption of the *economic man* and instead proposed to consider the more human *administrative man* (Scott 1992, 45) who is subject to the concept of *bounded rationality*. This means that although individuals try to act rationally, their decisions may not be consistent with objective rationality because of incomplete information, uncertainty of the assessment of future events, and the limited choice of options (Berger & Bernhard-Mehlich 2002, 140f.). Bounded rationality can explain many of the serious challenges arising from Green Business Model Transformations.

6.1.2 Organisations as Natural Systems

The second broad view that Scott identifies is to consider organisations as *natural systems*. In contrast to the rational view, the natural view considers social systems as evolved entities with an informal structure that has not been designed. Moreover, the natural systems view differs in its consideration of the nature and complexity of organisational goals, i.e. that stated and actual goals are not necessarily the same, and that – in addition to their *output* goals – "each [organisation] must expend energies maintaining itself" by pursuing *support* goals (Scott 1992, 52). Furthermore, Scott stresses that natural systems analysts emphasise the primacy of the goal of survival over all other goals that an organisation may have.

The following definition of organisations is compatible with the natural systems view:

> *"Organizations are collectivities whose participants share a common interest in the survival of the system and who engage in collective activities, informally structured, to secure this end."* (Scott 1992, 25)

Scott reviews several natural systems schools, including the following three: Mayo and the human relations school, Barnard's conception of cooperative systems, and Selznick's institutional approach (Scott 1992, 56ff.).

Mayo (1945) presented one of the most influential interpretations of the famous Hawthorne experiments[8] which implied that individuals and their motives were much more complex than the rational systems view suggested. The emerging human relations school thus puts the human being at the centre of reflections and differs from the rational systems view in some of its basic assumptions, namely that (Scott 1992, 59f.; based on McGregor 1960):

- By nature, most people do not dislike work
- Other means exist to reach organisational goals than control and coercion
- The most effective rewards address people's ego and desire for self-actualisation; people do not generally lack ambition, avoid responsibility, or seek primarily for security

The human relations school with its focus on the individual had significant influence on the topic of change that is discussed in more detail in chapter 6.2 and the following. However, despite its name, the human relations school has been criticised as "cow sociality" that is geared towards making workers more

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[8] The Hawthorne experiments aimed to find the optimal degree of illumination to maximise the productivity of workers. However, during the experiments, more, less and even no change to lighting each had a positive effect on productivity – supposedly because workers felt motivated simply due to the attention given to them (Mayo 1945).

productive in a subtle, incapacitating way – just like happy cows were assumed to produce more milk. Maybe more severely, many of the approach's promised positive effects on organisations could so far not be proven conclusively by empirical evidence (Scott 1992, 61).

Barnard's theory of organisations (Barnard 1968, first published 1938) considers them to be systems of cooperation that integrate a purpose with the individual motives of its members. Barnard's ideas have much in common with the rational view, but are set apart by his notion of "the nonmaterial, informal, interpersonal, and, indeed, moral basis of cooperation" (Scott 1992, 63). According to Barnard, organisations consist of three elements: communication, willingness to serve, and common purpose. Survival of organisations – which, according to Barnard, is rare to last long, though – depends on its effectiveness (i.e., the accomplishment of its purpose) and efficiency (i.e., the satisfaction of individual motives exceeds the sacrifices) (Barnard 1968, 82ff.). Since Green Business Model Transformations also serve greater ends than just financial success, this insight can be used to create a level of commitment that would be unimaginable for most other business transformations like mergers or offshoring programmes.

Selznick views organisations as "cooperative systems, adaptive social structures, made up of interacting individuals, sub-groups, and informal plus formal relationships" (Selznick 1948, 32). Selznick believes that some critical decisions change the character of organisations and make them unique; they become *institutionalized* (Selznick 1957). Individuals will resist being reduced to de-personalised *roles* and instead continue to act as *wholes*. Hence, due to individuals' goals, delegation will not lead (solely) to the desired results through the application of formal control mechanisms alone. Selznick suggests the use of *cooptation* as a means of informal leadership to address disturbances between consent and control, and to react to destabilising pressures of powerful individuals and interest groups (Selznick 1948). Smart use of a broad repertoire of behaviours to deal with resistance to change is often essential for the success of large transformations.

6.1.3 Organisations as Open Systems

Boulding (1956) introduced a hierarchy of systems based on their complexity. Organisations reside at the eighth of nine levels of complexity[9]: 1 through 3 are

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[9] The nine levels of system complexity are (summarised based on Boulding 1956, 202ff.): 1. Frameworks (e.g., the patterns of electrons around a nucleus), 2. Clockworks (systems with predetermined, necessary motions like the solar system), 3. Thermostat (control mechanism based on the transmission and interpretation of information), 4. Cell (open, self-maintaining systems, i.e. simplest parts of life), 5. Plant (differentiated and mutually dependent parts, determined by a genotype, or blueprint), 6. Animal (increased mobility, teleological behaviour, and self-awareness), 7. Human (self-consciousness, perception of time and history, ability to interpret symbols), 8. Social organisations (includes roles, value systems, etc.), 9. Transcendental (unknowables) .

physical systems, 4 through 6 biological ones, and 7 and 8 are human social systems. However, Boulding remarked that the theory of his time could just deal with level two or three. With the adoption of the *open systems* view, organisation theory has reached level 4 (Scott 1992, 78f.). This means that organisations are seen as self-maintaining. Through the injection of energy (i.e., the throughput of resources) from its environment, organisations can evolve further and avoid their otherwise inevitable degradation (analogous to the second law of thermodynamics in physics). As such, the common perception that an organisation must protect itself from the influence of its environment is considered misleading – it is this interrelation that enables survival in the first place (Scott 1992, 83ff.). Consequently, other than the closed systems perspectives described before, the open systems view concentrates on the relationship of organisations with their environment. Yet, the open systems view can be combined with both the rational and the natural systems perspective.

The following definition of organisations is compatible with the open systems view:

> *"Organisations are systems of interdependent activities linking shifting coalitions of participants; the systems are embedded in – dependent on continuing exchanges with and constituted by – the environments in which they operate."*   (Scott 1992, 25)

The open systems view highlights two further characteristics of organisations:

First, the fact that they are (often) *loosely coupled:* To a large extent, system elements can act independently of other elements – especially if their hierarchical proximity is low. One the one hand, this fact makes individual organisational units capable of acting and enables the organisation as a whole to be adaptive (Scott 1992, 82). On the other hand, loose coupling can also result in the often criticised practice of "departmental thinking", which is particularly prevalent in large corporations (and a problem for corporate transformations). Loose coupling is even present on the level of an individual's goals and actions (March & Olsen 1976), which can have profound impact on change management and resistance to change as it reduces predictability of behaviour.

Second, they are embedded in and contain (an abstract form of) *hierarchies* (see Scott 1992, 85f.). That is, when undertaking organisational change one needs to consider change at multiple levels: Change does not only happen intra-organisational, it can also take place on the level of the industry sector, the broad economic and political context, on the nation state level, or even on a global competition level (Pettigrew et al. 2001, 699). Within organisations, levels range from the organisation as a whole to divisions, departments, etc. down to individuals and their roles (Scott 1992, 85). In conclusion, organisations as open systems can be described as a "loosely linked coalition of shifting interest groups" (Scott 1992, 82; based on Cyert & March 1963; Pfeffer & Salancik 1978).

A number of schools from the open systems view are of interest for this work. Early ones include *systems design*, *contingency theory*, and Weick's *social-psychological model of organising* (see Scott 1992, 86ff.).

Systems design is based on general systems theory as already covered in chapter 4.5. It does not only seek to describe and understand organisations, as Scott remarks, but also aims to change and improve them. As explained before, the approach follows the understanding that systems are not reducible to its components. The analytical complexity of looking holistically at organisations is often offset by limiting the analysis to the relevant parts only. Consequently, systems design looks at inputs and outputs of elements but often treats the elements themselves as black boxes. Systems design also has well-known limitations: Analysts must be careful in applying analogies from less complex systems correctly and always be aware that it is not possible to predict complex systems' behaviour exhaustively (Scott 1992, 86ff.). This implies that the management framework in chapter 9 should allow for flexibility to cope with surprises.

Contingency theory can be viewed as a branch of systems design that is described by the following three assumptions (Galbraith 1973, 2; Scott 1992, 89):

- "There is no one best way to organize."
- "Any way of organizing is not equally effective."
- "The best way to organize depends on the nature of the environment to which the organization relates."

Lawrence & Lorsch (1967) argue that organisations face different demands from their respective environments, depending on the uncertainty and tempo of change. Because organisational subunits operate in different sub-environments, they need to be adapted independently (differentiated). For the success of the organisation as a whole, subunits must be well integrated as well – which, obviously, is an antagonistic goal. Naturally, large corporate transformations trigger disputes over where the right balance lies, both for individual subunits and the company as a whole.

Various aspects of contingency theory have been criticised. One argument of specific interest in the context of this work is that contingency theory assumes that the external environment is beyond the company's sphere of influence (see Kieser 2002, 185ff.). However, business model transformations almost always change not only the organisation itself, but also influence its customers, partners, or competitors – potentially even the larger business environment of the company. In fact, seeking for planned change of the external environment can offer much more rewarding results than just adapting the organisation to the external environment.

In his model of the *social psychology of organizing*, Weick (1979, first published 1969) argues that, instead of examining *organisations* and their structures, one should look at the process of *organising*. He believes that human beings organise in response to the uncertainty they are confronted with. They do so by the means of *interlocked behaviours* that are developed and maintained

between actors. Weick distinguishes the stages of *enactment*, *selection*, and *retention*. Enactment emphasises both the subjective perception as well as the individual exercise of influence on the environment. Selection is based either on *rules*, or, in the case of less standardised circumstances, on *communication-behaviour cycles* in which information is exchanged and interpretations are formed. The developed responses can then be repeated in comparable situations and become retained (Scott 1992, 91). Weick's view of organisations implies that individuals' behaviours are largely unpredictable and that its interpretation ("sense-making") frequently occurs only retrospectively (Weick 1979; 1995).

To conclude the overview on relevant organisation research, another three relevant open system theories that were introduced after 1970 are summarised in the following: *agency theory*, *population ecology*, and *resource dependence* (see Scott 1992, 105ff.).

Agency theory (e.g., Alchian & Demsetz 1972; Jensen & Meckling 1976; Eisenhardt 1989) deals with the question how it can be ensured that decision makers act in a way that is in line with an organisation's goals. For this purpose, agency theory considers the structure of principal-agent relationships, in which the principal (e.g., an executive manager) needs the agent (e.g., a subordinate manager or worker) to carry out activities to achieve a desired outcome. Both parties are assumed to act in their own personal interest – which may not be aligned. Incentive systems are used to make the agent act in a way desired by the principal. Due to the problem of information asymmetry, these incentive systems should ideally be designed to ensure that the agent is incentivised to act congruently to the principal's interests without the need for costly control systems (Scott 1992, 105). For example, a company wishing to build a green product portfolio may introduce a guideline that for each division at least 50 percent of newly developed products need to fulfil certain environmental criteria. However, since these criteria may be regarded as a burden that puts additional strains on development budgets, the divisions may come up with unimaginative, hastily developed modifications of conventional products that offer inferior value propositions. Alternatively, the corporate centre could decide to provide a special budget for the development of innovative green products. Because the divisions now compete for additional resources, they genuinely *want* to develop new green products. Then, the results of such efforts can be expected to be much more inspired.

Organisation theorists have provided many useful insights that can explain the behaviour of individuals and groups. Some of these perspectives – like scientific management and the human relations school – represent very different underlying philosophies and thus imply different courses of action. Theorists have also argued about why some firms survive and others do not. The view adopted on this question has profound consequences for the courses of action that can sensibly be recommended in any management framework. It is therefore necessary to look into the most important of these rivalling perspectives, starting with *population ecology* (Hannan & Freeman 1977; Aldrich 2007, first published 1979).

Population ecology has its roots in the work on natural selection by Darwin. It aims to explain why certain types of organisations survive and multiply while others do not. The underlying mechanism is assumed to be selection of the fittest: A population of organisations produces variety, the fittest mutants are selected and reproduced or duplicated (retention). Consequently, changes of populations of organisations are not assumed to be primarily the result of adaptation of individual entities, but of their replacement. Moreover, like in biological evolution, change is not equivalent to progress (Scott 1992, 113f.). Although the common unit of selection used in population ecology theory is the organisation as a whole, other levels like routines and competences are also used (Aldrich 2007, xxi). On this level, competencies of successful companies have a higher chance of selection and spread across a population of organisations through mechanisms like best practice sharing or consulting projects (Kieser & Woywode 2002, 259).

In contrast to population ecology, the *resource dependence* approach (e.g., Pfeffer & Salancik 1978) assumes that organisations can use mainly adaptation in order to survive. They do so by engaging in exchanges with their environment to acquire resources. Despite the dependence on resources, organisations are considered active entities that employ strategies to manage not only the organisation, but also the environment (Scott 1992, 114f.).

Even more degrees of freedom for managers are propagated by *strategic contingency* theorists (e.g., Child 1972) that stress the existence of strategic choice. Decision-makers face environmental constraints, but their choices are not determined by the environment (Scott 1992, 112) – they may even manipulate it (Child 1972).

Modern institutionalists (e.g., Meyer & Rowan 1977; DiMaggio & Powell 1983) would argue that these constraints mainly stem from pressures by social and political forces rather the dependence on efficient usage of resources (Zucker 1987). Hence, organisations are assumed to imitate practices with known legitimacy, whether they are economically efficient or not (Kanter et al. 1992, 29ff.).

6.1.4 Complexity Theory and Organisations

As noted above, organisation science has reached level 4 of Boulding's hierarchy of complexity by applying open system models, still falling short of the actual level of complexity of the object under study. Thus, researchers have attempted to use insights from complexity theory to better understand organisations, e.g. by viewing them as *complex adaptive systems* (e.g., Anderson 1999). There is no consensus yet in what way complexity theory can and should be applied to organisations (Stacey et al. 2002). Nevertheless, Anderson (1999, 217f.) has put forward six insights that are useful for organisation science, and which he considers to be well-established scientifically:

(1) Many dynamical systems do not reach a state of equilibrium – neither a static nor cyclical one (see Dooley & Van de Ven 1999). (2) Seemingly *random* processes may be *chaotic* instead. *Coloured noise* (constrained randomness) and

white noise (randomness) differ from chaotic systems in that the latter in fact imply the presence of a high degree of order and deterministic pattern – which is obscured by their non-linearity, though. As such, they are bound to limited patterns of "fractal" behaviour by revolving around a *strange attractor*; yet, specific occurrences still appear irregular and remain unpredictable (Stacey et al. 2002, 87ff.). (3) Small differences in initial conditions can have a large impact over time. This phenomenon of chaos theory is often referred to as the *butterfly effect*, where the wing flap of a butterfly can later cause a storm on the other side of the planet. (4) A holistic (instead of reductionist) view is often necessary to understand organisations. (5) Agents that follow a few simple rules can produce complex patterns of behaviour. (6) Complex systems that start from a random state tend to move towards order, i.e. they are *self-organising* (Kauffman 1993).

Scholars of complex adaptive systems have suggested that organisations should exist at the *edge of chaos*, i.e. in between a state of stable equilibrium and chaos. Stable organisations are only capable of incremental changes. That is, on their *fitness landscape*[10], they are capable of hill-climbing but cannot leave a local peak (stable attractor). In contrast, organisations in a chaotic state can move to other (potentially higher) peaks but are unable to stay at them. However, at the edge of chaos, organisations undergo frequent incremental and infrequent radical change – a condition that is considered ideal for survival (Kauffman 1993; Anderson 1999, 223f.). The shape of the fitness landscape is determined by the connections (i.e. conflicting constraints) within and between organisations in such a way that more connectivity produces more *rugged* landscapes (which have more but lower peaks) (Kauffman 1993; Levinthal 1997; Levinthal & Warglien 1999; McKelvey 1999; Stacey et al. 2002, 110ff.). Agents (or groups of agents), unable to foresee the systemic consequences of their actions, coevolve by trying to improve their own, dynamic fitness landscapes, thus creating emerging patterns of self-organisation (Anderson 1999, 223).

I argue that many companies have enjoyed a selection advantage in the past as they depleted resources and treated stakeholders in an unsustainable way. I further argue that the underlying fitness function is in the process of changing, but has not yet led the mainstream population of companies evolve towards more sustainable attractors.

The brief synopsis of organisation theory presented above inevitably omits many important contributions to the topic. Nevertheless, the different perspectives presented already point to important aspects to be considered when developing a framework for management practice. Moreover, the view of organisations as systems provides a bridge between the business model concept and the transformation aspect: the critical subject of organisational change.

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[10] The definition of "fitness" is non-trivial. It may include various performance measures (potentially associated with a trade-off), but for the sake of simplicity the metaphor it is usually assumed to be a single (or aggregated) measure like profitability (Anderson 1999, 225).

6.2 Theoretical Perspectives on Organisational Change

Some aspects of organisational change have already been touched upon briefly in the course of the introduction of organisation theory. Although representing only a part of the broader topic of organisations, organisational change is of high relevance for management practice and has thus led to the creation of vast amounts of literature on the topic. In order to filter out the most relevant aspects I will first present the various dimensions, characteristics, and types of change relevant to the scope of this work.

6.2.1 What Is Organisational Change?

The phenomenon of change is one of the oldest known themes in the history of philosophy: The Chinese ancient text *Yijing* ("Book of changes"), one of the five classics of Confucianism, views change as the result of "the dynamic balance of opposites", *yin* and *yang* (Wikipedia 2009b). Change is considered the continuous and inevitable process of movement (see Wilhelm & Baynes 1967, lv). In Western culture, the Greek philosopher Heraclitus is well known for his aphorism "Nothing endures but change." (quoted in Kanter et al. 1992, 9)

Unlike this philosophical perspective on change, in today's business world *organisational change* is typically seen as a deliberate, planned transition from some original state to a new one (Kanter et al. 1992, 9). In most cases, organisational change is associated with explicit goals whose achievement is later reviewed once the change process (or phases thereof) is completed (Burke 2002, 2f.). This is much in line with Lewin's (1951) "unfreeze-change-refreeze"-model of change. Although criticised for being overly simplistic, the discrete view on change is still prevalent in current management practice (Kanter et al. 1992, 9f.). An overview of more elaborate theories on organisational change is presented in chapter 6.2.3. Before, some common typologies of organisational change are described.

6.2.2 Typologies of Organisational Change

For the preliminary scoping of this work in chapter 2.3, I have used a combination of the nature and scale of change, dubbed "radicalness" (see figure 2.3). Weick & Quinn (1999) assert that the nature of change, i.e. whether it is continuous or episodic, is a widely used distinction in change research. Various other labels have been used to describe this dichotomy, including evolutionary vs. revolutionary; incremental vs. transformational; first vs. second order change. Other dimensions that have been used to categorise change are the style of change leadership and people involvement, the unit of change, the content of change, or the firm attitude towards change.

For example, Dunphy & Stace (1988) propose a process model of change based on the nature of change and leadership style dimensions to define four types of change: the combination of incremental vs. transformative and collaborative vs. coercive change. They also provide a more detailed version of that typology, now consisting of four leadership styles (collaborative, consultative, directive and coercive) and a range of four degrees of scale from fine-tuning to corporate transformation (Dunphy & Stace 2000, 381ff.).

Brown & Eisenhardt (1998) relate organisational change to the change of the external environment; the strategic challenge is to manage change in this respect. This can be done on three "levels": reactive, anticipating, or leading. Essentially, the three levels of change relate to distinct types of goals. Reactive change aims to counter competitor's actions or to exploit observable changes of the environment (e.g., policy changes or changed customer demands). Anticipating change aims at getting an edge vis-à-vis competitors by acting before the external change occurs or becomes evident. And finally, leading change means to start actively influencing the external environment itself in a favourable way, i.e. shaping the external environment of others (Brown & Eisenhardt 1998, 4f.). Green Business Model Transformations require a firm to adopt a proactive approach, be it out of a deliberate desire to lead or because the firm's survival is threatened.

Kanter et al. (1992, 14f.) have identified three "kinds of movement" (macro-evolutionary, micro-evolutionary, and revolutionary change) and further distinguish three "forms of change": identity, coordination, and control changes. Identity changes redefine the relationships of the organisation with its environment or - in the extreme case – completely change the nature of the organisation's business. Roughly relating to the micro-evolutionary type of motion, coordination changes refer to a "deliberate reshaping or revitalizing" of the organisation's internal working. And finally, control changes are triggered by shifts in ownership or governance, i.e. "makeover through takeover" (Kanter et al. 1992, 15). Green Business Model Transformations will usually entail identity changes, and definitely require coordination changes to make the new business model work.

As a last example, Van de Ven & Poole (1995) use a two dimensional typology based on the unit and mode of change. The unit of change differentiates between change that focuses on a single entity and change that relates to the interactions between multiple entities. The mode of change distinguishes between prescribed and constructive change, i.e. whether the change occurs within a given frame and sequence in a predictable way, or is created by breaking the existing framework. The typology results in four basic types of change generating mechanisms, or process theories, that will be used to present a systematic overview on theories of change in the following.

6.2.3   *Four Generic Types of Process Theories for Change*

Van de Ven & Poole (1995) have made a convincing attempt to systemise the various organisational change theories based on four generic types of process theories (primitives) for change. The four theory types are considered "motors"

that explain why and how the change process occurs; their matching with the various change theories helps to comprehend and compare them (and to scrutinise further research in the field, which is not part of this work, though). The four "motors" are (Van de Ven & Poole 1995, 512ff.):

1. *Life cycle theory:* Life cycle theory assumes that organisations undergo a set of cumulative stages of organic growth, starting with the organisation's birth and ending with its death. This means that the sequence of stages is fixed based on some imminent programme or rules. Moreover, the characteristics developed by organisations – at least in their basic forms – are thought to be predetermined based on the respective life cycle stage (Van de Ven & Poole 1995, 513ff.). There are various models of organisational life cycles. Quinn & Cameron (1983) developed a summary model with four stages based on nine earlier models: the *entrepreneurial stage*, the *collectivity stage*, the *formalisation and control stage*, and the *elaboration of structure stage*. Since this work specifically focuses on established and mature corporations, respective insights gained from life cycle change models are given special attention in a separate section (6.4.3) within innovation – a capability that is often considered a particular challenge for mature organisations.

2. *Teleological theory:* This school of thought follows the understanding that all movement of organisations is guided by its purpose and goals (and adaptations of the same). The purposeful planning character of organisations highlighted by teleological theory has its roots in the rational systems view. Van de Ven & Poole (1995, 514) name Weber and Simon as two of its pioneers. However, the concept of goal enactment (see Weick 1979) through consensus on means and cooperation (see also March & Olsen 1976) reveals that teleological change is also consistent with the natural systems view (see Scott 1992, 102ff.).

   In contrast to life cycle theory, teleological theory propagates much higher degrees of freedom for which types of changes an organisation can (and should) undergo at a given point in time. Only the external environment and the availability of resources constrain an organisation's change efforts. These can thus be assessed based on the organisation's progression towards the goal or envisioned end state; however, the theory does *not* assume that there is only one valid path the organisation must follow (Van de Ven & Poole 1995, 516f.).

3. *Dialectical theory*: Whereas teleological theory emphasises the common purpose of organisations, dialectical theory propagates conflict as its dominating force. Contradictory forces – thesis and antithesis – finally lead to synthesis (which may then replace the thesis). Stability and change are hence results of the balance or unbalance of power. While synthesis can create win-win outcomes, overthrowing the thesis with an antithesis (or the failure of such an attempt) is often a win-lose event. Change is generally considered neutral; it can be for the greater good (but not necessarily) (Van de Ven & Poole 1995, 517).

4. *Evolutionary theory*: In this school of thought, competitive survival is the driving force behind change. It follows a repetitive cycle of probabilistic variation, selection through competition for scarce resources, and retention through forces like inertia and persistence. On the level of competing organisations, the survival of particular ones cannot be predicted, but the general population dynamics can be explained. The theory is also applicable on a sub-organisational level, i.e. to determine how strategy making and organising within organisations works (Van de Ven & Poole 1995, 517ff.).

Figure 6.1 summarises the four process theories on organisational development and change:
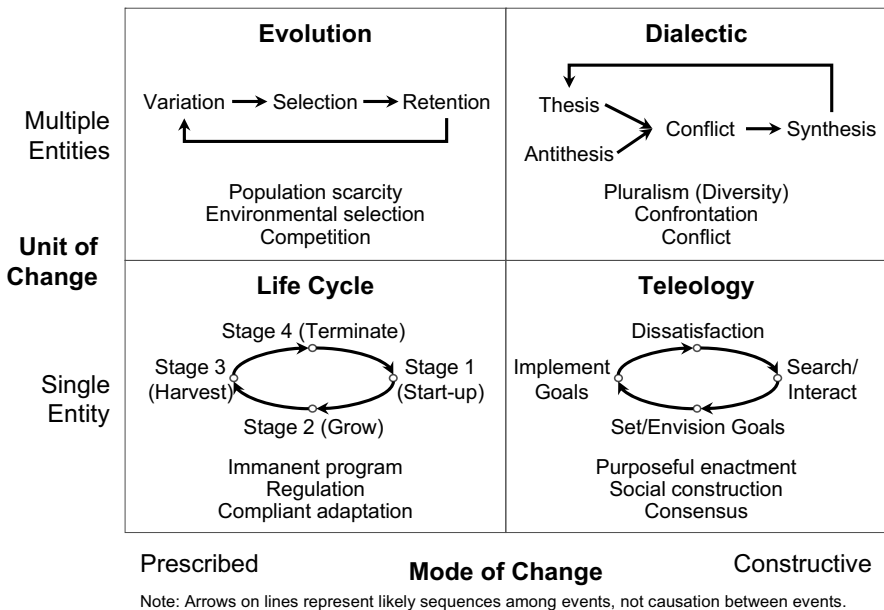

Note: Arrows on lines represent likely sequences among events, not causation between events.

Fig. 6.1 Process theories of organisational development and change (Van de Ven & Poole 1995, 520)

The matrix shows the respective cycles of change events and underlying generating mechanisms of the four process theories. They are classified based on their respective mode and unit of change: Teleological and dialectic theories produce constructive, directly influenceable change, whereas evolutionary and life cycle change follow prescribed patterns. Moreover, evolutionary and dialectic changes depend on multiple entities that interact (compete or antagonise each other). In contrast, life cycle and teleological theories mainly consider a single entity (which is under secondary influence of its environment, though).

Although managers tend to view their change programmes from a teleological perspective, it can be helpful to consider them from the other three theoretical angles as well. Some well-justified change efforts may fail simply because they contradict the life cycle stage of the company: they require a more fundamental organisational renewal in order for its members to *live* the change. Or, instead of coercively trying to force new strategic goals onto the organisation, it might be worthwhile to strive for a mutually beneficial synthesis with the coalition of the "old" organisation. And finally, instead of determining the means of goal fulfilment centrally (and potentially somewhat removed from practice), management may give some room for experimentation accompanied by a clever selection process for new routines and competencies. After all, it will be difficult to conceive the right way of doing things beforehand for such complex efforts like Green Business Model Transformations.

Real-world change will rarely occur as a result of only one of the four change motors; there will likely be overlaps and potentially even interrelations. For example, the implementation step in teleological change may trigger the antithesis in the dialectical change cycle. Change motors may operate at the same time or alternately; they may work on the same level of analysis or be nested within each other (e.g., one motor explains change on a sub-organisational level, the other for the organisation as a whole). Therefore, specific change theories that were created to explain particular change contexts tend to be more complex and incorporate several of the four basic process theories (Van de Ven & Poole 1995, 525ff.).

In the following, I will thus describe three specific change theories that are of interest with respect to Green Business Model Transformations of established companies:

Greiner's model of *organisational growth and crisis states* (Greiner 1998) warns against an approach that ignores the history and specific characteristics of the organisation. This model combines life cycle and dialectic change motors (Van de Ven & Poole 1995, 528). Second, a combination of teleological and evolutionary change, *organisational punctuated equilibrium* (Tushman & Romanelli 1985) is presented as the main metaphor for Green Business Model Transformations on a macro-level. And finally, the *garbage can model* of organisational change (Cohen et al. 1972) demonstrates how change is often *not* orderly and sometimes requires exploiting random processes rather than mechanistic planning. This change model is a special case as it is not considered to revert to any of the four basic change motors (Van de Ven & Poole 1995, 528).

Together with the organisation theories presented in chapter 6.1 (some of which also encompass aspects of change), the three change theories provide a fairly broad coverage of the 16 possible combinations of the four change motors (see table 6.1 for an overview[11]):

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[11] Van de Ven & Poole (1995, 529) remark that "the authors of these exemplary theories or models may not agree with our classification, because they did not have our framework in mind when they developed their theories."

Table 6.1 Specific change theories and their change motors (based on Van de Ven & Poole 1995, 528)

Specific change theories	Incorporated motors (generic change mechanisms)			
	Life cycle: "Immanent program"	Teleology: "Purposeful enactment"	Dialectic: "Conflict and synthesis"	Evolution: "Competitive selection"
Teleology (March & Simon 1958), see also 6.1	-	✔	-	-
Population ecology (Hannan & Freeman 1977), see also 6.1	-	-	-	✔
Org. growth and crisis stages (Greiner 1998)	✔	-	✔	-
Adaptation-selection models (Aldrich 2007), see also 6.1	✔	-	-	✔
Org. punctuated equilibrium (Tushman & Romanelli 1985)	-	✔	-	✔
Social psychology of organizing (Weick 1979), see also 6.1	✔	✔	-	✔
Garbage can model (Cohen et al. 1972)	-	-	-	-

6.2.4 Organisational Growth and Crisis Stages

Greiner (1998, first published 1972) proposed a model of organisational development that is based on alternating periods of growth and crisis. The organisation thereby passes through five life cycle phases of 3 to 15 years that mainly depend on the maturity and age of an organisation as described in table 6.2. A high growth industry thus results in shorter periods of stability between the crises. Moreover, a high-profit industry can delay the company entering a crisis stage, which also tends to be softer compared to those in poorer industries. Crises are generally caused as old solutions become inadequate for the new problems (Greiner 1998, 58). On the one hand, an (upcoming) crisis may be used to redirect the sense of urgency for change towards a Green Business Model Transformation. On the other hand, dysfunctional organisational structures and political fights during crisis states can jeopardise a clean transformation process. In any case, change managers should consider the organisation's specific life cycle characteristics. While infant companies in the first phase are not in scope of this work, phase-2 firms need to make sure that they do not follow too much of a

top-down approach, thereby neglecting many important details and losing commitment. Firms in the delegation phase might in fact encounter the greatest challenges as Green Business Model Transformations tend to require extensive coordination (if not planning). Companies in the coordination phase, in contrast, need to ensure that things get done, that the transformation does not get stuck in the bureaucratic machinery. Greiner's description implies that firms in the collaboration phase should be the easiest to transform. However, one may argue, that the most mature organisations also carry the most preconceptions, which are hard to come by because of their subliminal nature.

Table 6.2 Greiner's organisational growth and crisis stages (based on Greiner 1998)

Phase	Description	Crisis
1. Creativity	▪ Informal leadership and communication ▪ Growth leads to increasing inefficiencies in operations ▪ Usual solution: installing professional business leadership that gives the company direction	Leadership
2. Direction	▪ New functional organisational structure including specialisation and formal working procedures ▪ Increasing complexity and diversity eventually makes the directive leadership inappropriate ▪ Usual solution: Stronger delegation	Autonomy
3. Delegation	▪ Newly found motivation of lower managers in profit centres once senior managers let go and lower managers learn to handle the amount of responsibility ▪ Autonomy of the sub-units leads to a crisis of control; attempts to reinstall central management practices usually fail ▪ Usual solution: special coordination techniques	Control
4. Coordination	▪ New formal planning procedures and company-wide programmes of control and review; centralisation of certain technical functions; careful management of capital investment ▪ Headquarter and operating units lose touch and start to distrust each other ▪ Usual solution: replacing formal, bureaucratic systems with strong interpersonal collaboration	Red tape
5. Collaboration	▪ Team-based problem solving, interdisciplinary cooperation, and a matrix-type structure (mainly for senior management)	?

Greiner's growth and crisis states are rather simplistic and should be considered a stimulus for thought rather than exact science. In a commentary 25 years after the original publication of the model, Greiner speculates about what the fifth crisis may turn out to be. Other than in the original article, he identifies the lack of an

internal solution to growth, and brings up a potential sixth phase of networked organisations (Greiner 1998, 65).

It seems that many organisations today enter a crisis of integrating growth and sustainability. "Sustainability" could thus provide an alternative interpretation for a sixth phase to be added.

6.2.5 *Punctuated Equilibrium Theory*

Like population ecology, the *punctuated equilibrium* theory is a paradigm that has its origins in Darwin's theory of evolution. However, Gould & Eldredge (1972; 1977) presented a conception of evolution that disavows the original notion of incremental, cumulative change. Instead, they suggested a model that comprises "relatively long periods of stability (equilibrium), punctuated by compact periods of qualitative, metamorphic change (revolution)" (Gersick 1991, 12). Punctuated equilibrium has served as a guiding metaphor in many fields as diverse as adult development and the history of science. In the field of organisational change it has been introduced by Tushman & Romanelli (1985). Conceptually, there are three main components that form the basis of the theory: *deep structure*, *equilibrium periods*, and *revolutionary periods* (Gersick 1991, 13).

Gersick (1991, 16) compares deep structures with "the design of the playing field and the rules of the game". This descriptions sound very similar to some definitions of business models. However, Tushman & Romanelli (1985, 176ff.) go beyond that scope and consider five facets (which Gersick identifies as deep structures): (1) core beliefs and values, (2) strategic aspects related to products, markets, technology and competitive timing, (3) the distribution of power, (4) the organisational structure, and (5) the control systems. Hence, while the business model is an important part of deep structure, it also includes the organisation's culture, strategy, and its implicit and explicit structure.

During *equilibrium periods*, the deep structure remains untouched; instead, firms become more internally consistent and more skilled in what they do. As deep structures tighten and increase interdependencies of their parts, inertia grows (Tushman & Romanelli 1985; Gersick 1991, 16ff.).

It is during *revolutionary periods* when *deep structures* are fundamentally realigned. In the most radical cases, even core beliefs and values are changed, something that analysts have warned against (e.g., Collins & Porras 1996). The transition from system equilibrium to revolution originates from two possible sources: Internal changes that lead to misalignment internally or with the environment, or "environmental changes that threaten the system's ability to obtain resources" (Gersick 1991, 21). For example, customer demands can change in a way the firm is not prepared for. Internal change could relate to organisational growth which, at some point, destabilises the system. It should be noted that, while the growth argument sounds very much like a life cycle effect, punctuated equilibrium

does not propagate directed change towards an end state of organisations. Theorists stress the point that dismantling the old deep structures and building new ones are two separate tasks. Therefore a *need* for change is not sufficient to trigger a revolution to occur. Misalignment and failure merely set the stage and provide energy which then needs to be channelled (Gersick 1991, 21f.), e.g. towards a Green Business Model Transformation.

Punctuated equilibrium is the main metaphor used to explain and justify Green Business Model Transformations: Companies have long optimised their operations incrementally based on a stable set of goals that reflected fitness of organisations in the marketplace. However, this fitness function has begun to change in recent years when sustainability gained prominence and stakeholders like NGOs discovered additional means of influence through the internet. Sustainability has become a pivotal factor in the competitiveness of many firms (Haanæs et al. 2011), in some cases due to new market demands, in some cases due to novel, more effective and efficient ways to create and deliver value (Senge et al. 2008, 121ff.). These new circumstances make organisations ripe for radical teleological change – as there is a clear need for change.

    However, the punctuated equilibrium theory says little about the transition from equilibrium to revolution (Van de Ven & Poole 1995, 531). The topic of organisational inertia and ways to overcome it is the crux of Green Business Model Transformations; hence it is enlarged upon in a separate section (6.3.3).

6.2.6 The Garbage Can Model

The *garbage can model* is a special case: according to Van de Ven & Poole (1995) it does not make use of any of the four change motors. It is meant to explain organisational change in highly ambiguous settings, referred to as *organised anarchies* (Cohen et al. 1972). They are characterised by (1) problematic (inconsistent and ill-defined) preferences of decision makers, (2) unclear technology that is associated with a poor understanding of decision processes, and (3) fluid participation in which active decision makers change and devote varying amounts of energy (Cohen et al. 1972). The conditions above are frequently present in organisations like universities, but also in for-profit corporations. In fact, an organisation undergoing Green Business Model Transformations can be expected to fit the three characteristics of organised anarchies pretty well: At the outset, decision makers will rarely follow a consistent set of goals, and these may change as well once the implications are better understood. The decision process is also unclear due to the high complexity and uncertainty of the subject matter. Finally, people eligible as decision makers will show changing interest in participation based on how strong they feel affected and depending on competing issues vying for their attention.

Cohen et al. (1972, 2ff.) build their model based on four, relatively independent streams of *problems, solutions, participants*, and *choice opportunities* ("garbage cans"). *Problems* are concerns of external or internal people looking for attention. *Solutions* look for problems and are sometimes created before a suitable problem exists. *Participants* dump problems and solutions into available *garbage cans*. However, for a decision to be made, participants need to devote a sufficient amount of energy – depending on the attached amount of problems. Hence, a decision is made when – in a more or less random occasion – all streams meet in a certain way. Consequently, there are three styles of decision: (1) *by resolution*, meaning the problems attached to the choice are resolved, (2) *by oversight*, meaning that the decision can be made before problems are attached to it, (3) *by flight*, meaning that problems leave the choice for a more attractive one and the decision can finally be made without solving problems (Cohen et al. 1972, 8). The simulation of garbage can models imply rather poor results of decision-making of such organisations: Although most decisions are made within the simulated time period, relatively few problems are resolved (Cohen et al. 1972, 9ff.). Moreover, the model suggests that the effectiveness of decision-making represented by problem activity (i.e. the degree of conflict), problem latency, and decision time cannot be improved in all dimensions simultaneously (Berger & Bernhard-Mehlich 2002, 151f.).

Although the explanatory power of the garbage can model is clearly limited to specific circumstances or organisations (Cohen et al. 1972; Olsen 2001), its similarity to Green Business Model Transformations yields some valuable insights on the level of intra-organisational change:

First, it should be considered that many solutions necessary to operating a more sustainable business model may already have been found – there just were not suitable choice opportunities or problems available at the time. And indeed, this thinking fits very well with the broad argument I follow to explain why the vast majority of corporations have not yet adopted more sustainable business practices: Not because it is unfeasible or because the business environment would not reward it, but because companies didn't need to – their current business model has never been regarded as a *problem*, to which a solution had to be found. Consequently, the proposed change methodology in this work needs to recommend spending sufficient time in searching for *existing* solutions; this is likely to be much faster than inventing all new solutions from scratch.

Second, an appropriate provision of choice opportunities and level of participation is crucial: If participants are distributed to few, high-ranking garbage cans (e.g., large steering committees), the decision process is slow or may even come to a halt. Are there too many garbage cans (e.g., project groups), the energy of participants may be too low for reaching a decision, resulting in a severe loss in momentum. Moreover, limiting the access of participants to the decision-making process is not a solution either because detailed problems stay latent this way and threaten implementation (Berger & Bernhard-Mehlich 2002, 152). I have seen all these effects come into play during major transformations of otherwise well-functioning large corporations. Finding the right balance of participation and speed, delegation and leadership is a challenging matter indeed.

6.2.7   *The Theoretical View on Change Applied in this Work*

For the purpose of this work, understanding change in organisations is not an end, but a means to accomplishing Green Business Model Transformations. Hence, I must not decide which specific theoretical perspective to follow, or even to develop my own, new perspective. Instead, I can apply insights from all four basic process theories as needed. And indeed, as long as it is a conscious choice, the application of various relevant theoretical perspectives on specific aspects of Green Business Model Transformations can be expected to be particularly insightful, despite – or even because – I do not restrict myself to a single, self-contained theory.

   More precisely, I will consider punctuated equilibrium as the main metaphor to justify why Green Business Model Transformations can improve the fitness of established firms. I will use results from life cycle theory to gain a deeper understanding of what specifics should be considered for radical transformations in mature organisations. The transformation process will largely be structured according to the teleological approach. And finally, I will consider dialectic theory with respect to change management and external stakeholder management in the wake of the high-profile nature of the change efforts.

6.2.7.1   Limits to Planning and Control of Organisational Change

Radical representatives of population ecology theory believe that organisational change of individual entities is minor or random. All major change is assumed to occur on a population level through new entities and replacement. If this were the case, then green business models – if effective at all – would be spread through innovative, small companies that eventually replace the unsustainable giants of the past.

   However, I believe that some large companies contradict this one-dimensional view. IBM is one such example – a company with long tradition that survived serious crises and repeatedly transformed itself in many ways (IBM 2011a). For example, IBM transformed itself purposely from a pure play hardware producer to big player in the professional services business. It changed its structure from centralised to decentralised to a global matrix. From 2002 to 2007, IBM has increased its Indian workforce from less than 5,000 to 73,000 employees (IBM 2008b), which obviously has massive implications on corporate culture, leadership, and product delivery. One might argue that some of the revolutionary changes are to be attributed to life cycle phases (e.g., structural changes), random evolutionary variation (e.g., certain product and technology innovations), or just imitations of "institutionalized" management practices (e.g., building up workforce in India). However, some of these radical changes were highly controversial at the time and unprecedented. Hence, a constructive, deliberate element of change can hardly be denied in the case of IBM.

A trickier objection may be that constructive transformation is mostly random, meaning that organisational change is "only loosely coupled with the desires of organizational leaders and with the demands and threats of environments" (Hannan & Freeman 1984, 150). This perspective does not deny the possibility of major endogenous change, but questions whether it can be directed and controlled. Instead, purpose could be alleged to have been added retrospectively once actions turned out successful (see Weick 1979). The notion of complex adaptive systems (see section 6.1.4) leads to similar implications: The manager's role is reduced to changing the fitness landscapes for local agents as well as the organisational architecture that frames adaptation within the organisation (Anderson 1999, 228f.). Some scholars would even deny that these interventions are safe due to the unpredictability of long-term and system-level effects at the edge of chaos (see Stacey 1995; Stacey et al. 2002). Attempts of purposeful change would then be stricken with large failure rates (at least in the sense of the originally envisioned results). And indeed, I agree in so far as it is naïve to believe that a linear envision-plan-implement approach could suffice.

6.2.7.2 Towards a Considerate Approach to Organisational Change

A perspective on organisational change developed by Mintzberg & Westley (1992) may provide a path to reconcile the contradicting views on change as implied by complexity science (see Stacey et al. 2002) and the attempt to manage Green Business Model Transformations in a planned, controlled manner. Mintzberg & Westley (1992, 43f.) propose to condense the various possible approaches to organisational change to the following three basic approaches to change:

- *Procedural planning*: This change type is deliberate and deductive, i.e. conceptualised change programmes are translated into concrete, actionable steps. It corresponds to the terms "strategic planning" or "organisational development" frequently found in the relevant literature.
- *Visionary leadership*: A single, often charismatic leader (e.g., the CEO) conceives or adopts a new vision for the organisation. If the vision appeals to the wider organisation it can become a *shared vision* (Senge 2006) and set in motion revolutionary change. While the vision may be a deliberate choice or just the synthesis of signals from within the organisation, the details of its subsequent realisation will often emerge informally.
- *Inductive learning*: This process is informal, decentralised and can yield completely unexpected results. It corresponds to the "sand pile metaphor" used by complexity scholars (e.g., Anderson 1999): Much like a pile of sand on which grains of sand are dropped in a random fashion, most small change events will have no or little effect on the organisation as a whole. But sometimes, once a sufficient amount of such minor changes have occurred, a single grain of sand may create an avalanche and impact the behaviour of the entire organisation (for a broader discussion of organisational learning and its representatives see Fiol & Lyles (1985) and Crossan et al. (1999)).

Mintzberg & Westley (1992) view the three change approaches as complementary rather than alternative. They propose that the approaches are often combined in a sequential order: Inductive learning gives rise to a new vision which is then translated into concrete actions through procedural planning. Variations include the *informal* and *implicit change process* in which the procedural planning (informal) or the visionary leadership (implicit) are bypassed. Moreover, the learning can be done by external parties (e.g., consultants); however, the authors warn against bypassing the internal vision process in this case – they claim it leads to "mindless" change (Mintzberg & Westley 1992, 45f.).

The fact that inductive learning frequently brings about surprises does not mean – as some authors suggest – that the learning has to occur completely random. In contrast to biological evolution, so I argue, humans have the ability to distinguish more promising fields of learning from others through conclusion by analogy or imitating competitors and peers. Critics may object that this prevents true novelty from emerging (Stacey et al. 2002). However, I argue that novelty is merely restricted to certain search fields (that are more likely to produce "fit" solutions) – as long as learning from the past or peers is not understood as pure copying. In fact, many of the most notable innovations (think of Apple's iPhone) were in some ways simply reconfigurations of existing components (also see chapter 6.4).

Considering Kauffman's fitness landscape model (see chapter 6.1.4), the perspective on change brought forward above could be translated as follows: Inductive learning relates to "hill climbing". For incremental change, no visionary leadership is required; learning can succeed without a new overarching direction. Procedural planning may assist in implementing the results of inductive learning in an efficient manner (i.e., climbing the hill faster, or on a more direct route). Perhaps, inductive learning has accumulated in a way that reveals some information about other peaks of the fitness landscape. Early on, the effects of jumping to another peak will be largely unknown. This includes the height of the peak, as well as the non-linear changes of the fitness landscape(s) resulting from new, discontinued and shifted connections within the organisation and to other network entities. Systems thinking can help to understand some of these dynamics (but certainly not all). Visionary leadership would then correspond to finding the direction and distance of the jump. Procedural planning would be responsible for the "technical" execution of the jump and efficient hill-climbing once landed (as the jump will most certainly not happen to hit the top of the new peak).

Authors who consider the outcomes of planned change to be entirely unpredictable, and who insist that the power law underlying the edge of chaos produces extinction events completely beyond the control of human intervention, will heavily object at this point. However, I argue that some developments are to a certain degree foreseeable (e.g., that global warming will have an increasing effect on the global economy) and can hence be exploited by "informed guessing", combined with adaptation once the 'factual' future unfolds itself. Moreover, to use another metaphor, snow avalanches can neither be predicted in terms of when,

where or how they occur; however, targeted detonations can be used to trigger artificial avalanches instead, thus reducing the risk, and – in Kauffman's terms – avoiding most of the large extinction events.[12]

In conclusion, I believe that prescribed change motors are real and limit which aspects of an organisation its corporate leaders can and should influence. Moreover, managers will never be able to accurately predict the longer-term future or foresee the full range of implications of their planned change initiatives. However, I sincerely believe that astute corporate leaders and their staff have the capacity to lead radical change efforts in an auspicious direction and overcome the complete randomness of biological evolutionary systems by the capacity that distinguishes humans from other biological organisms – the cognitive process of reasoning.

6.3   Change Management

> *"Change is not made without inconvenience, even from worse to better."*
> Richard Hooker (1554–1600), Anglican theologian (Wikiquote 2011a)

The definition of "success" in organisational change is a challenge in itself. It may be some function of "the quantity, quality, and pace of change" that has been achieved, often involving a trade-off (Pettigrew et al. 2001, 701). Up to now, descriptive, theoretical aspects of change were in focus. Yet, in order to minimise any trade-off and achieve the goals of their Green Business Model Transformation, firms need to develop a practical understanding of the change process and be able to take appropriate courses of action. The following sections thus outline how change in organisations can be managed.

In contrast to the descriptions of structured and smooth corporate change processes that can be found in many books and articles, the real thing tends to be messy and gruelling (Kanter et al. 1992, 369ff.). Change initiatives frequently take longer than initially planned, severely strain employee morale, and consume a

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[12] Stacey et al. (2002) have brought forward the argument that using different causal frameworks for different levels or participants of change is problematic (and inconsistent). For example, they argue that if researchers associate managers with teleological change (i.e., as observers outside the system) whereas organisations are treated as uniform organisms that are subject to evolutionary change, they neglect the fact that organisations consist of humans as well, and hence cannot be treated as if they were not. Stacey and colleagues might be right from a philosophical perspective (they use Kant to back up their arguments) and also from a "technical" perspective (e.g., on a micro level, respective metaphors for change might break down). A detailed exploration of their argument would go far beyond the scope of this work; however, they miss the point here: It is often sufficient to know *roughly* what reality (or the future) looks like to make 'good enough' decisions. Like Newton's laws are sufficient to determine the approximate motion of objects at speeds and scales that exist in everyday life, I reason that organisational change is best managed by applying "dirty" approximations rather than discarding planned change completely (note that the physics analogy frivolously refers to a system of lower complexity).

large amount of management attention (Kotter & Schlesinger 2008). This raises the question whether the problem is rooted in poor change management or simply the uncontrollable nature of change. The theoretical perspectives on change presented previously suggest that the truth probably lies somewhere in between: On the one hand, many dos and don'ts seem to be neglected repeatedly by the responsible managers (Kanter et al. 1992, 386). On the other hand, change theories based on evolutionary and life cycle metaphors suggest that change cannot be constructed at will. In addition, systems theory implies that organisations are very complex entities; hence even well-planned change is certain to bring about surprises. Consequently, while it is important to consider the limitations of change management, it is an imperative to make the most of its potential.

In the following, I will therefore enlarge upon some of the most important strategic factors that significantly influence the success or failure of change initiatives:

- The adequacy of the nature of the change initiative in reference to its goals
- The pacing of the change initiative
- The understanding of the roles of change
- The handling of inertia and resistance to change.

6.3.1 Choosing the Appropriate Type and Pace of Change

As explained earlier, one of the most common typologies of change contrasts evolutionary with revolutionary change (Burke 2002, 11). In accordance with this distinction, March (1991) presents two alternative strategies for change: (1) *exploitation* of old certainties, and (2) *exploration* of new possibilities.

Exploitation is based on the "refinement and extension of existing competences, technologies, and paradigms" and promises "positive, proximate, and predictable" returns (March 1991, 85). In contrast, *exploration* is associated with "uncertain, distant, and often negative" returns (March 1991, 85). Because both strategies compete for the same resources, managers need to choose – and they understandably often opt for exploitation (March 1991, 71ff.). March further claims that exploitation can be self-destructive in the long run. For example, he argues that it can degrade organisational learning and also diminish competitiveness in critical dimensions where it is important to be among the best of many competitors: Due to reduced performance variability, an exploitation-improved mean performance may not suffice.

Green Business Model Transformations correspond to March's exploration strategy. Hence, there is no need to enlarge upon strategies of evolutionary change; merely, it is important to keep in mind that the alternative to business model transformations (i.e., optimising the current one) will often be considered to be safer and more desirable. Therefore, conflict may not only erupt on the question whether there is a need for change or not; opinions can also diverge on the beliefs about which type of change is more appropriate (Crossan & Berdrow 2003).

Every change effort is different. However, scholars have formulated some broad insights that seem instructive for managing revolutionary change in general (Weick & Quinn 1999, 374; based on research on effective large group interventions by Bunker & Alban 1992):

Systems theory serves as the theoretical reference for such change efforts. Compared to traditional approaches the organisation engages more actively with its environment and information is shared widely. Organisational learning is not limited to the level of individuals or groups, but also includes the organisation as a whole. Furthermore, a common understanding of the change together with a more participative approach can speed up the change effort compared to slow, hierarchy-oriented models. This means that accountability is spread throughout the organisation and does not exclusively rest with senior management. At the same time, consultants play a less prominent role in the change process.

In addition to the question whether change is to occur in many small or few large steps, managers must decide how much of the change is to be realised in which timeframe, i.e. the pace of change. The pace of change has two sometimes conflicting perspectives: an *absolute* and a *relative* one. The former is relevant with respect to an organisation's internal capacity to change, while the latter refers to competitiveness on the level of organisations.

From a strategic perspective, companies must consider their relative pace of change compared to their industry peers, and also the broader business environment (e.g., regarding legislation and stakeholder expectations). If a company is adapting, but not as fast as what has been coined the *clockspeed* of its industry, it falls behind its competitors (Fine 1998). An ever increasing speed of change has led some management scholars to argue for radical rather than incremental change to avoid a rat-race within the sector (Voelpel et al. 2005). Moreover, if a company does not adapt fast enough to the changing broader business environment – e.g. with respect to sustainability standards – it could lose its social licence to operate in the worst case (e.g., Sells 1994). On a larger scale, an entire industry sector that continuously lags behind the developments of the broader business environment risks coming under scrutiny or even becoming obsolete eventually (Hart & Milstein 1999). The introduction of one revolutionary green business model, however, might halt this development. Yet Green Business Model Transformations also carry the risk that a company gets too far *ahead* of its time. Companies that introduce too progressive business models too early or too quickly risk that they are rejected by bewildered customers, unconvinced business partners or even internal resisters. For example, unlike Toyota's hybrid car, the Prius, GM's more radical design of a fully-electric vehicle (the "EV1") was discontinued a few years after its initial release in 1996. The exact circumstances of the programme cancellation remain controversial, but one factor certainly was that the business environment for electric cars was not as favourable yet as it is today (see 7.8). Conversely, this is not to imply that firms should sit and wait – rather they need to actively prepare their business ecosystem and relevant stakeholders (see Schneidewind 1998).

From the internal perspective, a high pace of change puts a strain on the organisation. Sastry (1997) stresses that if organisations do not have sufficient time to rebuild competences after strategic reorientations, the performance level of the organisation will be consistently low. All organisational change is thereby subject to the respective time cycles of an organisation (Pettigrew et al. 2001, 700). To control the pace of change, Brown & Eisenhardt (1998, 162ff.) thus propose to introduce an artificial, calendar-based organisational rhythm of change which they refer to as *time pacing*. In contrast to reactive *event pacing* (which, for example, is triggered based on the industry clockspeed), time pacing "counteracts the tendency of most managers to wait too long, move too slowly, and lose momentum" (Brown & Eisenhardt 1998, 167). Conversely, in turbulent industry settings time pacing may be used to slow down change in firms that risk being too responsive to external events – which may turn out to be passing fads.

In conclusion, a company can make too large or too small steps, and change too fast or too slowly. In order to find the right balance, Kotter & Schlesinger (2008) identify four situational factors that they believe need to be considered for every change initiative: (1) the amount and type of expected resistance; (2) the balance of power between the initiators and resisters; (3) the sources of required information and support; and (4) the actual need and urgency for change. The authors argue that the stronger the anticipated resistance, the weaker the initiators, the more distributed the required information, and the lower the short-term pressure for change, the slower the change should be carried out. Furthermore, they state that a faster change requires more clear-cut plans, a more aggressive stance on resistance, and allows for less involvement of others (Kotter & Schlesinger 2008, 137ff.).

Resistance against Green Business Model Transformations should be expected to be strong and multifaceted, the resisters numerous and powerful, the relevant information widely dispersed and the impact deep but often rather long-term. All this suggests applying a very long timeframe for change. However, a slow transformation carries the risk that some basic business model assumptions become invalid before it is fully implemented: some opportunities can fade quickly (e.g., because competitors seize them first) and formerly invisible threats can materialise unexpectedly (e.g., in the form of new entrants or legal requirements). Hence, the timing cannot be freely chosen independent of external conditions. Because the success of Green Business Model Transformations is also heavily dependent on a strong internal commitment which conflicts with strong coercion, other means of accelerating change need to be employed. These may include a sophisticated communication strategy to create a strong sense of urgency and build momentum, intense involvement of the CEO and other board members to counterbalance powerful resisters, disciplined project management, and a suitable transformation organisation to make information flows across organisational boundaries as efficient as possible. The roles that individuals and groups play in change efforts are thus summarised next, the other aspects in later sections.

6.3.2   Roles in Change

During the discussions of change in the previous chapters organisations were mostly treated as abstract entities that undergo or resist change according to various theoretical models. However, eventually, change is implemented and received by human beings. Hence, the human factor, the roles they play as individuals and groups within organisations are critical to every change effort.

6.3.2.1   Change Agents

The dedicated group of people that are usually considered responsible for making change happen are referred to as change agents. Interpretations of the role of the agent range from rather technical to strategic tasks (Dunphy 1996, 543f.). With respect to episodic (transformative) change, Weick & Quinn (1999) consider the change agent to be the "prime mover" who creates (and not only redirects) change. He does so by concentrating on inertia and key leverage points, and thereby "changes meaning systems: speaks differently, communicates alternative schema, reinterprets revolutionary triggers, influences punctuation, builds coordination and commitment" (Weick & Quinn 1999, 366). Kanter et al. (1992, 376ff.) remark that a too narrow view on change agents is highly misleading; they identify three main groups that need to be distinguished in accordance with Lewin's unfreeze-change-refreeze model: *change strategists*, *change implementors*, and *change recipients*. In an earlier work, Ottaway (1983) proposed a taxonomy that is also compatible with Lewin's change model and even more granular, featuring ten types of change agents. Whether it is useful in practice to distinguish ten types of change agents is debatable; yet one important insight for the management framework in chapter 9 is that different individuals may be needed as change agents during different stages of Green Business Models because their respective roles differ substantially.

6.3.2.2   Leaders and Leadership Styles

Leaders have long been an important subject in management science. Although some scholars have come to question the influence that leaders actually have on the success and direction of "their" firm (e.g., Stacey et al. 2002), their role continues be considered pivotal in mainstream management literature (Nadler & Tushman 1990).

Change initiatives depend on the successful work and interplay of several types of leaders, namely *executive leaders* that "need to shape the overall environment for innovation and change" (Senge 2006, 320), *local line leaders* who help to establish changes in work routine, and *network leaders* who disseminate new ideas and practices throughout the organisation (Senge 2006, 319ff.). Green Business Model Transformations require strong leaders. Their success, however, not only depends on their skill, but also on the appropriate leadership style.

Over half a century ago, Tannenbaum & Schmidt (1973, originally published in 1958) presented a continuum of leadership behaviour and discussed under which circumstances the respective patterns should be applied. The continuum contrasts

the authority used by the manager with the degree of freedom of their subordinates. The authors provided a framework consisting of three "forces" to determine the appropriate leadership style: forces in the manager (e.g., his confidence in the subordinate and own leadership inclinations), forces in the subordinate (e.g., the subordinate's needs for independence, tolerance of ambiguity, commitment, and expertise), and forces in the situation (e.g., organisational culture, team effectiveness, and the type of problem). The appropriate leadership style can thus vary even on group level depending on the particular setting.

In a retrospective commentary 25 years later, Tannenbaum and Schmidt acknowledge that they had ignored some factors related to the external environment that impact the appropriate leadership style and have grown in importance meanwhile. Among other things, these environmental factors include societal demands for considering stakeholder interests and sustainability issues (Tannenbaum & Schmidt 1973, 166ff.).

The importance of external factors may have increased even further. Nadler & Tushman (1990) discuss the requirements of leadership in the wake of intense global competition and the need to manage system-wide change of incremental as well as revolutionary nature at a rapid pace. They conclude that what is needed is a leadership style that goes beyond what the *charismatic leader* alone can offer: they further demand instrumental leadership and institutionalising the leadership for change.

The charismatic leader is described as someone who is capable of envisioning the future in a compelling way, can energise (or motivate) the organisation, and enable its members to take action. However, the above described prototype of a change leader also faces multiple problems in practice; these may include the creation of unrealistic expectations, strong dependency and the "need for continuing magic" (think of Steve Jobs from Apple), as well as disempowered lower level management with a reluctance to disagree (Nadler & Tushman 1990, 84). Hence, according to Nadler and Tushman, charismatic leadership should be complemented with *instrumental leadership*. Instrumental leadership encompasses structuring the change effort, controlling of behaviour and results, and rewarding desired behaviour systematically (Nadler & Tushman 1990, 85ff.). Obviously, a company cannot magically dig up gifted leaders as described above just for the occasion of transformation: However, it can at least assign leaders that match the requirements most closely and resist the temptation to keep all "indispensable" leaders in their line jobs.

6.3.2.3 Teams and Team Effectiveness

Teams (or groups, the terms are used interchangeably) represent one of the central elements of modern corporations (Cohen & Bailey 1997). Not surprisingly, the topic of team performance has received a large amount of attention (Hackman 1987; Mathieu et al. 2008). Based on Kozlowski & Bell (2003), Mathieu et al. (2008, 411) define *work teams* as

> *"collectives who exist to perform organizationally relevant tasks, share one or more common goals, interact socially, exhibit task interdependencies, maintain and manage boundaries, and are embedded in an organizational context that sets boundaries, constrains the team, and influences exchanges with other units in the broader entity."*

Various typologies of teams have been suggested, but the adequacy of a single distinguishing criterion is questionable. Possible criteria include *homogeneity of members*, *stability of their operating environment*, or the *duration of existence* (Mathieu et al. 2008, 411f.). Examples of types of teams other than work teams that are addressed in management literature include *project teams*, *management teams*, and *virtual teams* (Cohen & Bailey 1997).

One of the best-known models for team performance is Tuckman's framework of *forming, storming, norming, performing,* and – added later – *adjouring* (Tuckman 1965; Tuckman & Jensen 1977). According to this model, teams undergo a fixed sequence of stages before they start performing. Gersick (1988) challenges that view. Instead, she proposes that team development follows a pattern of punctuated equilibrium (see section 6.2.5): After the team is formed it enters a stable period of execution of the work procedures agreed during the team's initiation. At about half time towards the team's official deadline, a revolutionary period starts. During this transition, outsiders are consulted, old work procedures are questioned and new perspectives are adopted (Gersick 1988, 16). This revolutionary period shows dialectical characteristics and is "an opportunity for, not a guarantee of, progress" (Gersick 1988, 34). In summary, responsible managers and project leaders should pay special attention to the two transition periods when the team is formed and at midpoint, where the leverage to positively influence the prospects of the outcome is especially high.

Researches have been seeking to extract insights about the factors that influence team performance for decades. Mathieu et al. (2008) have reviewed research on this topic from 1997 to 2007. They use an input-mediator-output framework that is an extension of the traditional input-process-output framework. In the framework, performance is considered in terms of quantity and quality of output. Inputs that affect performance are "*individual team member characteristics* (e.g., competencies, personalities), *team-level factors* (e.g., task structure, external leader influences), and *organizational and contextual factors* (e.g., organizational design features, environmental complexity)" (Mathieu et al. 2008, 412). Mediators also influence performance; they include team processes and emergent states (e.g., team confidence, empowerment, team climate, cohesion, trust, and collective cognition) (Mathieu et al. 2008, 420ff.). The research on team performance is not easily summarised, and a comprehensive discussion of the results would go beyond the scope of this work. Hence, only selected results are presented that are specifically relevant for teams that can be expected to play an important role in Green Business Model Transformations. These include factors that can be influenced regarding project teams and (top) management teams.

The composition of *top management teams* influences their performance (Cohen & Bailey 1997, 269ff.), but is hardly considered a factor that can usually not be altered just for the occasion of a Green Business Model Transformation and is hence omitted in this overview.

Strategic consensus was found to be positively correlated with performance of top management teams (Mathieu et al. 2008, 430). However, empirical research conducted by Kilduff et al. (2000) reveals that high performing teams in fact show high interpretative ambiguity in the beginning and only reached strategic consensus towards the end of their life cycle (low performing teams show the opposite patterns). These results suggest opening up the opportunity space for the executive team at first and reducing ambiguity by means of a structured planning process afterwards.

In their review of team performance literature from 1990 to 1996, Cohen & Bailey (1997) found that in contrast to work teams, *project teams* do not necessarily benefit from higher autonomy (possibly due to cultural factors). Instead, leadership – both in terms of task- and person-based leadership – seems to play a pivotal role in the success of teams (Burke et al. 2006). This highlights the importance of assigning a gifted leader to Green Business Model Transformation projects. In addition to leadership skills as such, it is highly important to select someone who is respected in the line organisation (which makes the team's output more credible) and is well connected to provide the team with the necessary contacts and resources within the organisation. The organisational support is a central issue in strategic sustainability-related projects. In addition to a well-connected leader, project teams should have sufficient mandate to get access to respective resources within the organisation. Moreover, a motivating reward system is essential for strong team efforts (Hackman 1987, 324ff.). In its extreme form, project teams get the feeling that they can truly make a difference; paraphrasing Maslow's words, "the task [is] no longer separate from the self" (Senge 2006, 194).

With respect to team composition, Hackman (1987, 327) proposes to make them just large enough so that the work can still be accomplished, but to avoid any dysfunctions that large groups tend to show. For large transformations, this implies the necessity of a hierarchy of teams (that needs to be managed, too).

Functional diversity was found to have both positive and negative effects on project team performance (Cohen & Bailey 1997, 263). On the one hand, diversity allows covering a high share of the required expertise within the (core) team (Hackman 1987, 326f.) and the team can integrate different perspectives which can spur innovativeness of teams (Cohen & Bailey 1997, 263). On the other hand, diversity has been observed to negatively affect performance. This may be due to increased conflict within the team. And indeed, functional diversity has been found to be positively correlated with task disagreement. However, the ability of a team to be innovative and effective largely depends on the management and communication of task disagreement by members and leaders, and *not* the degree of functional diversity as such (Lovelace et al. 2001). It has also been suggested that teams with high diversity may seem less effective in the short-run, but that

they in fact play out activities that are then prevented later in other parts of the organisation (Cohen & Bailey 1997, 263). That is, ideas are tested earlier and work products become more robust.

In order to achieve a higher degree of diversity in project teams of large, geographically dispersed organisations, teams may be designed as (partially) virtual teams. However, Gibson & Gibbs (2006) warn that the team's ability to produce innovation may suffer from its "virtuality"[13]. Virtuality is related to geographic dispersion, electronic dependence, structural dynamism (frequent changes in members, roles and relationships), and national diversity. All four aspects of virtuality were found to be negatively correlated with innovation. However, a "psychologically safe communication climate, defined as an atmosphere within a team characterized by open, supportive communication, speaking up, and risk taking" (Gibson & Gibbs 2006, 455) can protect a virtual team's power to innovate (even more so than for non-virtual teams). Team requirements shift depending on the transformation stage, and thus may necessitate reassignments.

Proponents of the paradigm of the learning organisation consider *team learning* as one of its five essential disciplines (Senge 2006, 216ff.). Senge stresses that teams need to be aligned in order to reduce the waste of energy and redirect it for efficient team effort. Without alignment, attempts to tap team member's full potential via measures of empowerment will fail to show positive results.

Teams are advised to enter a state of dialogue in addition to discussion. While discussion is understood as a competition of viewpoints leading to decision-making, dialogue is considered a process of suspending own assumptions to fundamentally reconsider issues and learn in a deeper sense. This way, teams are believed to become much more intelligent than the sum of their individual members can be. A prerequisite for fruitful dialogue is the absence of leadership during these phases; contributions of team members must weigh equally – independent of rank (Senge 2006, 221ff.). Together with a shared vision, team learning techniques can surface defensive routines and thus support the team's efforts with energy rather than generating inertia (Senge 2006, 239f.).

Dealing with the phenomenon of *inertia* is central to the success or failure of any change initiative; it needs to be investigated both on the level of whole organisations (organisational inertia), and with respect to managing behaviour of individuals or groups.

6.3.3 Organisational Inertia

Inertia is a key concept in all analytical frameworks for transformative change (Weick & Quinn 1999). Pfeffer (1997, 163) defines inertia not as the absence of change but as "the inability for organizations to change as rapidly as the environment".

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[13] Innovation was measured in terms of perceptions of members, and "the percentage of innovation achieved as rated by customers downstream in the process", respectively, in two separate studies (Gibson & Gibbs 2006, 486).

6.3.3.1 An Evolutionary Change View on Inertia

Population ecology theorists actually consider organisations with high inertia (and not adaptability) to have a selection advantage. Hannan & Freeman (1984) regard structural inertia as a by-product of institutionalisation which in turn facilitates *reliability* and *accountability*. Structural inertia can be generated by internal factors (e.g., sunk costs, political coalitions, normative standards) and external factors (e.g., barriers to entry, relations with other organisations). Within organisations, their core aspects are the hardest to change (listed in decreasing order): stated goals (or general purpose), forms of authority, core technology, and marketing strategy in a broad sense, including target customers and the securing of resources (Hannan & Freeman 1984). Obviously, business model transformations can affect core aspects of organisations, at least the latter two. Hannan & Freeman (1984, 157ff.) further argue that structural inertia generally increases monotonically with age and size of organisations, while the death rate decreases ("liability of newness"). Following this line of argumentation, organisational renewal should thus increase the death rate of organisations, and more so for complex ones which require more time to change fundamentally. However, empirical research in the airline industry casts some doubt on the general validity of these conclusions (Kelly & Amburgey 1991).

Punctuated equilibrium theory as described by Tushman & Romanelli (1985) similarly puts inertia at the centre of the change process. However, punctuated change is considered the result of managerial decision-making, not random variation. Sastry (1997) has translated this change model (see 4.5.2.1) into a causal loop diagram:
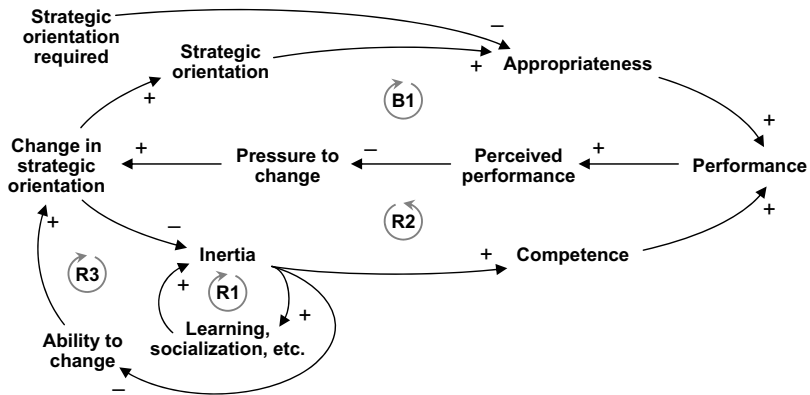

Fig. 6.2 Simplified causal loop diagram of the punctuated equilibrium change theory (Sastry 1997, 244)

Inertia is modelled as a stock that builds up or is reduced over time. Other state variables are the organisation's strategic orientation (i.e., deep structure), its perceived performance, and the pressure for change. The causal loop diagram contains four feedback loops:

- R1 reflects the building up of inertia as structures and routines become institutionalised
- R2, set in motion by R1, leads to increased competence, which improves (perceived) performance and reduces pressure to change.
- R3 describes how increasing inertia also reduces the ability to change.
- B1 describes the increasing misalignment of the strategic orientation with the changing environment as long as no fundamental organisational change happens.

Hence, R1 through R3 describe the reinforcing feedback loops that prevent major change during equilibrium periods. Only when the appropriateness of the strategic orientation becomes so low that it outweighs the achieved high competence levels, revolutionary change erupts. However, the simulations of Sastry (1997) revealed that the predicted change patterns did not always materialise. Sastry proposes to add two change management routines to the theory in order to get the desired patterns of change: monitoring for organisation-environment consistency and trial periods for change that prevent the unnecessary destruction of competencies.

In summary, evolutionary organisational theories view inertia as the flipside of competence and performance (punctuated equilibrium) or reliance and accountability (population ecology). Managers cannot influence inertia directly, rather its rate of change. As can be observed in figure 6.2, only previous fundamental changes are thought to reduce structural inertia "by disrupting existing networks, injecting new themes into the organizational culture, and bringing in new organizational members" (Sastry 1997, 249). However, Kelly & Amburgey (1991) remark that this may only be true for strategic change of the same kind. Moreover, recent empirical work on change questions whether at all prior change increases the likelihood of further change based on methodological issues of previous studies (Beck et al. 2008).

Furthermore, the evolutionary view seems to be conflicting with Peter Senge's systems view on organisational change. He states: "The harder you push, the harder the system pushes back." (Senge 2006, 58). However, both views might eventually describe the same in the sense that one cannot simply force change upon the system. Indirect measures like emphasising the misalignment with the market requirements and questioning the factual versus the perceived performance of the firm in order to generate a sense of urgency for change are much more elegant ways to affect inertia. Scholars have also argued that the arrival of a new CEO may make this task a lot easier (Kotter 1995, 60; Greiner 1998, 64). On the other hand, inertia is also seen as a protection from too much or unnecessary change. It does not protect, though, from distorted views on performance and strategic fit with the environment, or an unbalanced prioritisation of the same (Sastry 1997, 265f.).

6.3.3.2 A Competition-Based View on Inertia

Miller & Chen (1994, 2) define *competitive inertia* with respect to "the level of activity that a firm demonstrates in altering its competitive stand". It can be strategic or tactical in nature. According to Miller and Chen, the former might concern M&A or business model components like strategic alliances or important new products; the latter price changes, advertising, or minor product adjustments.

Competition- or adaptation-based perspectives on inertia and change management differ from the selection-based, evolutionary view in several ways: First, inertia is mainly considered a problem to be overcome, not an inevitable by-product of organisational virtues. Second, the managerial influence to make organisations "change-ready" is assumed to be much higher. Finally, resistance to change is considered more on an individual, behavioural level rather than in terms of structural inertia on the organisational level. The factors that influence competitive inertia also differ from structural inertia: They include *incentives to act*, the *awareness of action requirements and alternatives*, and the *constraints on managerial action* (Miller & Chen 1994).

As discussed before, past performance can become an *incentive to act*. However the relationship between past performance and change is contested and probably quite complex with respect to competitive inertia. While some scholars argue that poor performance provides an incentive to question current routines and scan the environment for new opportunities, others believe that managers may feel pressured to vindicate their past decisions and stay on their current course (Miller & Chen 1994, 3ff.). Miller and Chen propose that poor performance can pave the way for tactical rather than strategic changes. The latter is considered to be induced by market growth and opportunities. This line of argumentation fits with the rationale that companies who consider environmental sustainability a threat tend to focus on incremental measures like reducing energy use, waste or CO_2 emissions, while companies that view sustainability as an opportunity are eager to invest in new products and markets.

In contrast, success is generally associated with high inertia because it reinforces current practices and makes current leaders more powerful (Miller & Chen 1994). Moreover, organisational learning theorists (e.g., March & Olsen 1975; 1976) warn that learning under ambiguity can result in misinterpretations regarding the causality of success. Individuals then tend to perceive and interpret later events in a way that perpetuates their previous (potentially false or outdated) attitudes. Alternatives are frequently not even considered and little practical experience accumulates in areas that are not recognised as being important to the success of the firm. Consequently, such neglected areas are subjectively considered less promising and systematically underestimated (Berger & Bernhard-Mehlich 2002, 157). Sustainability advocates argue that this is exactly the case with many areas of opportunity in the sustainability domain (Berchicci & King 2007).

As a second relevant factor, the *awareness of alternatives* can reduce competitive inertia: Diversity of customers and competitors inspire companies to experiment on competitive practices. The same has been suggested for another factor, past experience with competitive change, but empirical evidence was weak (Miller & Chen 1994, 14). As discussed earlier, structural inertia is believed to increase with age and size of the firm (Hannan & Freeman 1984). However, Miller & Chen (1994) did not find empirical support that *managerial action is constrained* this way in the airline industry. Their study, however, supported the warnings of population ecologists that strategic change may actually hurt performance, at least in the short run (Miller & Chen 1994, 14f.).

The reflections on the phenomenon of organisational inertia presented above illustrate two things: First, the emergence of inertia is a complex issue, and second, its implications on an organisation's performance are ambivalent. Nevertheless, every change manager responsible for a major organisational change initiative needs to deal with it in management practice – ideally in a way that allows the change to happen without destroying valuable competencies.

6.3.4   Resistance to Change as a Change Management Issue

6.3.4.1   Phases of Resistance and Adoption

There are many models that describe the process of adoption – and resistance – of change. Carnall (2007) presents a simple five-stage model (see figure 6.3) derived based on works of Adams et al. (1976) and Kets de Vries & Miller (1984).

During the *denial* stage, employees highlight the effectiveness of existing procedures, self-esteem is reinforced and performance tends to remain unaffected (in the case of a disruptive change, however, it may suffer immediately). In the *defence* stage the change takes a clearer form, change recipients consequently start to devote much energy to keep the status quo, and as a result, performance drops. Resistance can take various forms: for example, it can be open or beneath the surface; it can be individual or collective (Tushman et al. 1986); and it can be destructive (to the point of sabotage) or constructive – and should then be considered valuable feedback to improve the change effort (Ford & Ford 2009). Once change recipients recognise that the change is inevitable and/or necessary they enter the *discarding* stage. Self-esteem starts to recover while performance approaches its minimum. During *adaptation*, performance is still low initially as new systems, procedures, structures, etc. have to be (re-)learned first. This learning process requires effort and can be rather painful. It is not until the *internalisation* phase that performance reaches or exceeds pre-change levels. At that point, the change effort has been fully integrated into the organisation (Carnall 2007, 240ff.).
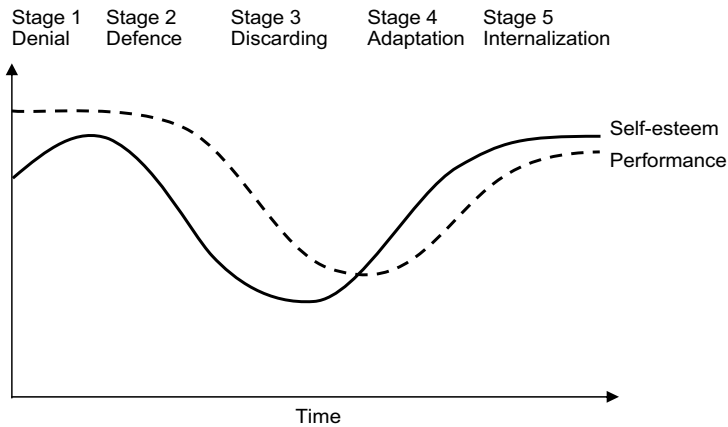
Fig. 6.3 The coping **cycle** (Carnall 2007, 241)

Research on smoking addiction illustrates how difficult it can be for humans to unfreeze their behavioural patterns (Prochaska et al. 1992). Progression through the stages is not linear and people fall back to the old habits three or four times before the change effort is finally successful. Hence, adoption on an individual level may actually follow a spiral rather than a linear pattern (Weick & Quinn 1999, 373).

Moreover, Senge (2006, 203f.) points out that there are qualitative differences in how committed people are to a cause: Most people just show variations of c*ompliance – grudging*, *formal*, or *genuine* – depending on how convinced they are. *Enrolment* means that someone will do what is possible within a given frame; an enrolled person intrinsically wants to make it happen. A *committed* person would go even further and is willing to change the relevant conditions for action if necessary.

Obviously, individuals that experience large scale change in organisations will not all go through the above described phases simultaneously. Some will adopt changes earlier than others, based on how the change affects them, but also based on the individuals' personality and preferences (if they are bold vs. cautious, etc.). With respect to innovations, people are often categorised according to a bell curve (Rogers 1962): a small number of *innovators* adopt the innovation first, followed by the larger group of *early adopters*. The e*arly* and *late majority* represent the largest groups followed by the *laggards* who are the last to adopt the innovation. A successful adoption would therefore follow an S-shaped pattern over time.

Whether or not that adoption pattern can be realised may depend upon whether or not a *tipping point* is reached (Gladwell 2000). That is, there is no guarantee that changes are not reversed again once the pressure for change is lowered – even though many people (but not a critical mass) have fully embraced the change (Sterman 2008). The more sources of resistance there are, the higher this tipping point will generally be. Hence, change management puts strong emphasis on tactics to identifying and neutralising such sources of resistance.

6.3.4.2 Sources of Resistance to Change

The first important step when tackling resistance to change in practice is to identify the underlying reasons for resistance. Jameson (1999) describes a framework that distinguishes three dimensions of conflict, each of which has different implications for conflict resolution strategies: First, there is the *content* dimension, i.e. the nature of resistance. For example, it can be based on objective or subjective grounds, task-based or driven by relational issues. Second, there is the *relational* dimension. That is, resisters can be more or less independent of the change initiators; they can have equal or unequal status, have high or low trust, and be a homogenous group (e.g. one department) or multi-party. Third, there are *situational* factors.

Del Val & Fuentes (2003) have identified two dozens of individual sources of resistance to change in literature that occur during the change formulation and implementation stages. Discussing the implications of each of the identified items is not expedient. Instead I will use four broad categories of sources of resistance adapted from Kotter & Schlesinger (2008, 132ff.):

1. *Self-interest*: One of the most dangerous sources of resistance is wilful resistance from powerful individuals. They may realise that the planned change would bring about a loss of power and status, or create new undesired interfaces and tasks. In this case, "politics" start. The special danger lies in the fact that this type of resistance is immune to rational arguments (the resister well understands the rationale for change) and will often be underneath the surface – individuals will usually refrain from arguing based on their own interests when they contradict the company's goals.
2. *Misunderstanding and lack of trust*: This source of resistance is usually based on poor communication and asymmetric information. Hence, simple misunderstandings can often be easily rectified. However, if the organisation has built a deep mistrust against management over time (possibly due to unfair behaviour in past initiatives), the situation is much more difficult to resolve.
3. *Divergent assessments*: When incomplete information exists either on the side of the initiators, or of the resisters, their assessments may diverge. It has been argued that this type of resistance is not only a threat, but also an opportunity (Ford & Ford 2009). Divergent assessment can also be based on rather subjective grounds like values or perceptions (Jameson 1999). Often, employees are truly interested in the success of their company and may have good reasons to object the change. Consequently, in any case the initiators should reconsider both content (as some assumptions may be wrong) and process (the degree and scope of involvement in decision-making) of the change initiative.
4. *General aversion to change*: Uncertainty and the fear of the unknown can be a powerful source of resistance that does not directly relate to the specific change initiative at hand. This type of resistance may even include the "winners" of the change who are unsure whether they can cope with the new situation. People might also feel pressured by their peers, or feel obliged to positions they endorsed in the past that stand in conflict with the current change initiative.

6.3.4.3 Mitigating Measures for Resistance to Change

There are various strategies and tactics to deal with resistance to change. They differ in how appropriate they are with respect to the type of resistance but also in which objectives they can meet satisfactorily (Jameson 1999). For example, management may want to stay fair in the process and maintain a good relationship with the resisters. In other cases, avoiding future resistance in similar situations may be a major concern. Moreover, resistance management can lead to more or less optimal solutions from a content perspective (Prein 1987). And finally, timeliness, costs and required resources always represent more or less important constraints. It is needless to say that the objectives listed above are not without trade-offs (Jameson 1999).

Kotter & Schlesinger (2008) list six practical measures to address resistance to change. They emphasise that it is the right mix depending on the reasons for resistance that determines their effectiveness. This fact often represents a major issue in practice as leaders find it difficult to adapt their personal style (which may be authoritative, cooperative, etc.) to the specific situation. The six measures are (summarised from Kotter & Schlesinger 2008, 134ff.):

- *Education and communication:* To clarify the logic behind the change effort is effective, but expensive, time-consuming, and requires a certain level of trust. Various channels should be considered.
- *Participation and involvement:* This measure is crucial when necessary information is missing or commitment (not only compliance) is needed; however, it is infeasible for time-critical change, and results may be poor if participation is not thoroughly managed.
- *Facilitation and support:* Measures may include training and various forms of support or rewards (also emotional) to cope with the change. This path is well-suited to reduce fear and anxiety, but also time consuming and expensive.
- *Negotiation and agreement:* Offering something in return for agreement can be a good option if resisters are powerful. However, it may harm content aspects, with a (future) risk of being blackmailed.
- *Manipulation and co-optation:* (Potential) resisters can be manipulated through the selective use of information. Co-opting means giving powerful resisters a special role in the change effort to gain their endorsement. This strategy is sometimes highly effective, but risky in terms of building and preserving trust.
- *Explicit and implicit coercion:* Playing it hard is fast but risky as compliance is reached at best; it is more attractive in cases when the change would be unpopular anyway.

The following table summarises the effectiveness (○ = low, + = medium, ++ = high) and risks (○ = low, - = medium, -- = high) associated with each measure related to the four reasons for resistance:

Table 6.3 Effectiveness and risks of measures against resistance to change by source of resistance

Measure \ Source	Self-interest	Misunderstanding, lack of trust	Divergent assessments	General aversion to change
Education and communication	○ / -	+ / -	++ / ○	+ / ○
Participation and involvement	+ / --	++ / -	++ / -	+ / -
Facilitation and support	○ / ○	+ / ○	○ / ○	++ / ○
Negotiation and agreement	++ / --	○ / -	+ / -	○ / -
Manipulation and co-optation	+ / --	+ / --	+ / --	+ / --
Explicit and implicit coercion	+ / -	+ / -	+ / --	+ / -

Of course, the representation in table 6.3 is highly simplistic: Neither does it consider the plurality of goals mentioned above, nor are the individual ratings of effectiveness and risk to be considered definite for all types and contexts of change. Rather, they serve as a rough guideline to develop tailored strategies and tactics to deal with resistance to change:

Manipulation and coercion can be effective against all types of resistance; however they are also very risky as they jeopardise trust and cooperation between management and the larger organisation. Therefore they should be only employed if other measures prove ineffective or take too long (Kotter & Schlesinger 2008, 136f.).

Due to their deep impact, Green Business Model Transformations will likely trigger all four types of resistance. Many individuals in various areas will lose or gain power and status. However, negotiation must not be used to a degree that it endangers the logic of the new business model. Therefore, involvement of all critical areas of the company is crucial as it can ensure a broad commitment within the organisation. The commitment works as a social barrier to objecting change out of self-interest. Misunderstandings will also be a common issue as sustainability is a wide and complex subject that few people know and understand in all its facets. This may of course also lead to strong disagreement on the business case for the transformation. Again, this reinforces the need for involvement and emphasises the importance of education and communication. Third parties like external experts or consultants can also be used to educate the organisation and manage participation. As "neutral" mediators they can be effective in resolving diverging assessments. Moreover, consultants may serve as lightning rods; they can deliver unpopular change without putting too much strain on intra-organisational relations.

Due to the magnitude of change, strong reflexes based on a general aversion to change should also be anticipated. However, to the degree that the transformation is communicated in a credible way, employees may also develop a strong emotional feeling that the company is moving in the right direction in a moral sense. This may be a powerful source of momentum that can easily outweigh any unspecific aversion to change (Hage & Aiken 1970).

6.3.5 *Practical Guides for Change Management*

Numerous "cookbook" recipes for change are available to change agents and managers that hope to find a way to make executing change manageable (e.g., Beer et al. 1990; Galpin 1996; Kanter et al. 1992; Kotter 1995). These "n-step guides" for change ('n' being the number of sequential steps, phases or stages) usually claim to be applicable to a wide array of different change efforts and types of organisations. N-step guides for change have been criticised for being overly simplistic and mechanistic (Collins 1998, 82ff.). On the one hand, one cannot deny that these guides inevitably neglect the complex, non-linear aspects of change that put limitations on prediction and planning. Dimensions of change like social and political activity, corporate culture, external circumstances, or even the personality of important leaders tend to be ignored. On the other hand, at least they can keep change agents from making easily avoidable mistakes. Furthermore, management science has little to offer as an alternative: Change theorists have failed to-date to produce a comprehensive general theory of change, let alone one that is easy to apply in management practice. After all, using no guide for change whatsoever is unlikely to produce better results than a thought through n-step guide – at least if it is applied with careful consideration of its limitations and common sense.

One example for a comprehensive n-step guide to organisational change is Kotter's "Eight Steps to Transforming Your Organization" (Kotter 1995). This approach will be used to exemplify how theory on organisational change[14] can be translated into management practice.

Kotter presents eight steps that companies need to go through in order to make successful change happen, and explains the major pitfalls that exist in each phase. Kotter does thereby not address a particular type of change initiative. Like in other comparable approaches, making a big mistake in one of the phases, as well as trying to skip or shorten any of them is considered potentially devastating (Armenakis & Bedeian 1999, 303). Kotter's eight steps and respective pitfalls are summarised in the following table:

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[14] Like for most prescriptive approaches to change, the underlying viewpoint focuses on the teleological nature of change. As I have argued before, insights from other process theories of change (see chapter 6.2) should not be discounted, even though they are harder to depict in an easy-to-digest format.

Table 6.4 Eight-step guide for organisational change (based on Kotter 1995, 60ff.)

Step	Description (verbatim from Kotter 1995, 60)	Major pitfalls (shortened from Kotter 1995)
1. Establishing a sense of urgency	▪ Examining market and competitive realities ▪ Identifying and discussing crises, potential crises, or major opportunities	▪ Underestimating the difficulty to create openness to change ▪ Overestimating the already achieved level of urgency ▪ Lack of patience (skip the phase) ▪ Lack of leadership (executives fear downside risks)
2. Forming a Powerful Guiding Coalition	▪ Assembling a group with enough power to lead the change effort ▪ Encouraging the group to work together as a team	▪ No history of teamwork (especially outside of hierarchies) ▪ Lack of line management involvement
3. Creating a Vision	▪ Creating a vision to help direct the change effort ▪ Developing strategies for achieving that vision	▪ Vision too complicated or blurry ▪ Without a clear vision, the initiative can degrade to a number of incompatible projects
4. Communicating the Vision	▪ Using every vehicle possible to communicate the new vision and strategies ▪ Teaching new behaviours by the example of the guiding coalition	▪ Too little communication: all available channels must be used repeatedly ▪ Behaviour and statements of some senior managers contradict communication messages
5. Empowering Others to Act on the Vision	▪ Getting rid of obstacles to change ▪ Changing systems or structures that seriously undermine the vision ▪ Encouraging risk taking and non-traditional ideas, activities, and actions	▪ Narrow job categories impede realisation of change ▪ Conflicting compensation / performance-appraisal systems ▪ Reluctance to change from superiors
6. Planning for and Creating Short-Term Wins	▪ Planning for visible performance improvements ▪ Creating those improvements ▪ Recognizing and rewarding employees involved in the improvements	▪ Losing momentum without wins after 12 to 24 months ▪ Lack of clear plan to achieve short-term goals reduces urgency levels
7. Consolidating Improvements and Producing Still More Change	▪ Using increased credibility to change systems, structures, and policies that don't fit the vision ▪ Hiring, promoting, and developing employees who can implement the vision ▪ Reinvigorating the process with new projects, themes, and change agents	▪ Declaring victory too soon may lead to reversal of change effort; remaining conflicts with vision are not resolved ▪ The root-cause of problems during this phase often lie in half-hearted efforts in previous phases
8. Institutionalizing New Approaches	▪ Articulating the connections between the new behaviours and corporate success ▪ Developing the means to ensure leadership development and succession	▪ Link between performance and the change initiative is not communicated clearly enough ▪ Change is personified so that it ends with the next generation of managers

Kotter emphasises the importance of creating a sense of urgency in the organisation: He believes that 75 percent of management need to be convinced of the need for change. This is easier to achieve during times of organisational crisis, although less resources are available in such cases to carry out the change effort. In both cases, externals (e.g., consultants, analysts) can be used as messengers to amplify the sense of urgency (Kotter 1995, 60ff.).

Some of the above-mentioned problems of n-step guides to change can be avoided if they are tailored to specific types of change initiatives. Not only can the individual steps be described in much more detail, but opportunities and potential

pitfalls that are specific to the type of change can also be addressed. One example of such an approach is a six-step approach designed to develop and implement a green corporate strategy by The Boston Consulting Group (Rubel & Sommer 2007): The first three steps represent the *outside-in-view* and include assessing the general business context (step 1), conducting a stakeholder analysis (step 2), and evaluating the activities and positionings of relevant competitors and peers (step 3). The desired result of this phase is the optimal strategic environmental positioning of the firm. The strategic positioning integrates the theoretical optimum of the firm's positioning (based on its capabilities and customer/stakeholder needs) with the competitive realities considering competitors' market power and positionings and their potential future moves. The second part, the *inside-out view*, is concerned with filling the strategic positioning with life and making it happen. It comprises the development of an explicit green vision, mission and strategy (step 4), the development of concrete, actionable items (step 5), as well as effective internal and external communication of the green transformation (step 6) (Rubel & Sommer 2007).

Kotter's eight steps deal with the change aspect of transformations while the BCG approach also incorporates content-related tasks. It is important to realise that both are intertwined: content generation itself can be considered a change management activity, and the most sophisticated change management approach is useless (and potentially even dangerous) if the company falls short on the design of the core concept. Creativity is usually required to enthuse customers, surprise competition, and create competitive advantage. Hence, the last section of this chapter examines the question how creativity emerges in corporations and is successfully commercialised.

6.4 Theoretical Perspectives on Organisational Innovation

6.4.1 What Is Organisational Innovation?

Innovation has been studied by scholars of economics for a long time (e.g., Schumpeter 1912). In the context of organisations, the following definition has found broad acceptance:

> *"[Organisational innovation is] the adoption of an idea or behaviour that is new to the organisation."* (Hage 1999, 599). Hage continues, *"The innovation can either be a new product, a new service, a new technology, or a new administrative practice."*

This definition implies that an innovation does not need to be completely new to the world; it also includes ideas transferred from other industries or markets, for example. Furthermore, it is congruent with the elements of business models, although the elements beyond products (e.g., novel revenue models, target groups, processes, etc.) do not always receive due attention in academic discourse. Moreover, technical and administrative aspects of innovation cannot be seen in isolation (Van de Ven 1986, 592), just as the business model concept highlights.

Yet, business models as such have largely been neglected in the context of innovation both by organisation and strategic management literature (Teece 2010, 192). Works on the topic that have already been discussed (see 4.6) mainly deal with innovating new business model designs. However, general insights from innovation research are vital to manage the broader innovation process and to inform the management framework in chapter 9.

Innovation is often contrasted with *invention*. While both represent novelties, the latter has not yet been commercialised and widely adopted. An invention has merely proven to work in a laboratory or in simulations and might still take a long time before it becomes an innovation (if at all). One example is that of commercial aircrafts: After the invention of the aircraft (proven by a successful test flight in 1903), more than three decades passed until commercial viability could be demonstrated and aircrafts became an innovation (Senge 2006, 5f.). However, as Van de Ven (1986, 592) remarks, "[n]ew ideas that are not perceived as useful […] are usually called mistakes." As a result, there is a certain bias in innovation research as "mistakes" are normally not included.

As a rare exception in the field of sociology, findings on innovation were largely consistent and have accumulated over decades (Hage 1999, 597), although some questions remain disputed. After a short presentation of the various types of innovation, important insights that help fostering innovativeness are laid out.

6.4.2   *Typologies of Organisational Innovation*

The three most common typologies contrast *administrative* vs. *technical* innovations, *product* vs. *process*, and *radical* vs. *incremental* (Damanpour 1991, 560). Incremental innovations are the only ones that are out of scope in this work (as long as they are not part of a larger, non-incremental business model innovation).

Henderson & Clark (1990) have proposed a more granular typology for product innovations: They distinguish between innovations that (a) reinforce or overturn core concepts, and (b) change *linkages* between core concepts and components – or not. The resulting four types of product innovations are (1) *incremental innovation* (reinforcing / unchanged), (2) *modular innovation* (overturned / unchanged), (3) *architectural innovation* (reinforced / changed), and (4) *radical innovation* (overturned / changed). Within this framework, incremental innovation would typically be out of scope. However, the most interesting point that arises from this typology is the following: Incremental innovations (like minor efficiency improvements of the engine of a car) – even when introduced by competitors – work in favour of currently dominating players as they can make full use of their existing competencies. In the case of modular innovation (e.g., involving more significant engine redesigns like incorporating new injection systems or turbo chargers, Magnusson & Berggren 2011, 319), most competencies are still useful, although some new ones are needed and others may become less important. The remarkable insight that Henderson & Clark (1990) bring forward is that in the case of architectural innovation (and also radical innovation), existing competencies

can in fact be a *handicap* for incumbents, because unquestioned assumptions – what they refer to as *dominant design* features – become invalid (e.g., fully-electric power trains allow for very different car designs, see 7.8). Unlike most radical innovations, however, architectural innovations initially may not even be recognised as such.

Many business model innovations will be of an architectural or even radical nature. Hence, there is a very real threat for established companies that their long-standing competencies in executing their existing business model disadvantage them vis-à-vis newer competitors when undertaking Green Business Model Transformations.

With his bestseller "The innovator's dilemma" (Christensen 1997), Clayton M. Christensen popularised the concept of *disruptive technology* (also see Bower & Christensen 1995), later more accurately referred to as *disruptive innovation* (Christensen & Raynor 2003; Christensen et al. 2004). In contrast to Henderson and Clark, Christensen argues that distinguishing between incremental and revolutionary innovations based on their attributes is not very meaningful. Instead, he proposes to view them as either *sustaining* or *disruptive*. The former means to sell better products for more money to attractive customers – circumstances under which incumbents were found to be greatly advantaged. In contrast, *disruptive innovation* targets new or unattractive customer segments with simpler products for less money. This type of innovation is supposed to be better suited for new entrants. The great risk for incumbents is that the formerly inferior products evolve and increasingly fulfil the needs of more demanding customer segments, eventually capturing the entire market (Christensen & Raynor 2003, 31ff.).

Looking at low value segments may also be rewarding for green business models. Simple, low-tech solutions embedded in smart business models often save energy and other resources, come at lower cost, and are still sufficient for most customers. Especially base of the pyramid (BoP) markets have to be considered a fertile ground for respective experiments (WEF 2009). Increasingly, large multinational companies seek to tap into these new growth markets (Simanis & Hart 2006, 44). As large and established companies are at the centre of consideration in this work, respective specifics relating to innovation are discussed next.

6.4.3 Innovation in Large and Established Companies

The relationship between the size of an organisation and its rate of adoption of innovation is complex. While Damanpour (1992) found a positive relationship, Hage (1999, 606) even pleads that the variable of organisational size should just be ignored by researchers. He claims that irresolvable methodological problems are associated with it – for example, the relationship greatly varies by industry (Freeman & Soete 1997, 234). Generic statements concerning this matter should thus be met with caution. Meta-analyses of innovation research (e.g., Damanpour 1991; Hage 1999) have revealed significant correlations with other variables, though. Most notably, specialisation (typically measured by the number of different occupational types) is positively correlated with all kinds of innovation

types of organisations (Damanpour 1991, 576). Other positive associations were found for "functional differentiation, professionalism, managerial attitude toward change, technical knowledge resources, administrative intensity, slack resources, and external and internal communication" (Damanpour 1991, 569). In contrast, centralisation was found to have a significant negative correlation with innovation (Damanpour 1991).

The case of radical innovations

One claim related to organisational age made by some researchers is that companies become less and less likely to create radical innovations the older they get (Anderson 1999, 227; Van de Ven 1986, 596). Others argue the same to be true for large companies, suggesting that their inertia hinders them in realising radical innovation (Schaltegger & Wagner 2008, 40ff.). Ettlie et al. (1984) argue that size is correlated with higher structural complexity, formalisation and decentralisation – factors which in turn rather promote incremental innovations than radical ones. However, Damanpour (1996) found that complexity and size are in fact *positively* associated with radical innovation. Slack resources, the availability of technical knowledge, and an attenuated financial risk of failure are among the potential causes he names (Damanpour 1996, 699).

   As researchers seem to disagree whether or not size and complexity favour radical innovations, perhaps, the chosen strategic orientation of an organisation provides a more fruitful explanation (Miles et al. 1978; Damanpour 1996). At least for the companies that strategically seek to strive through radical innovations, it is essential to put due effort into overcoming respective disadvantages and exerting own strengths for radical innovation. This includes forgetting "old certainties" from the established business model that are no longer valid, borrowing key resources that are invaluable, and being ready for explorative learning (Govindarajan & Trimble 2005).

Establishing a focus on innovations

As noted above, the challenges for large corporations to remain innovative are manifold: They are highly complex, fragmented, and often very "political" organisations – a characteristic that goes against the common notion of an entrepreneurial and innovative firm. Kanter (2008) proposes to overcome these disadvantages by implementing standardised processes to free capacity for high-value activities and establishing shared values that guide decisions without formal leadership mechanisms. This way, the organisation is not occupied with continuous fire fighting and stays flexible yet focused to pursue innovative ideas. Senge (2006) goes beyond the concept of shared values and calls for establishing a shared *vision* within the company: According to Senge, through a shared vision an organisation can hold the creative tension necessary to produce significant innovation – even during times of crisis. Dougherty (1992) remarks that innovators who belong to different functional areas within large firms may not disagree about general goals, but produce "interpretive barriers" that need to be dealt with for effective innovating.

Innovation strategies for large and established companies

Damanpour & Wischnevsky (2006) suggest distinguishing between innovation-generating and innovation-adopting companies. Established companies in many ways are incentivised *not* to search for disruptive innovations in their own industry sector. Not only is the risk of failure relatively high, but even success could jeopardise profits from current products and processes. Hence, it may be reasonable to wait for proof of concept from a small competitor and then conquer the market as a fast second mover through superior competencies and resources (Markides & Geroski 2005). However, incumbents need to be careful not to kill such innovations through ill-conceived financial analysis: Christensen et al. (2008) point out that traditional financial analysis can lead to non-competitive costs and performance erosion in the long-run: First, when fixed and sunk costs are ignored when evaluating an investment in a new technology, there is a heavy bias towards the current technology. However, new entrants who do not have this bias can gain a long-term competitive edge if the incumbent considers the *usable* rather than the *competitive* lifetime of its assets. Second, methods of discounted cash flow (DCF) and net present value (NPV) usually assume that doing nothing (as the alternative to investment in innovation) leads to constant performance. However, as new entrants and competitors do innovate constantly, the base case should be performance erosion rather than stagnation (Christensen et al. 2008). Established companies can circumvent many of the problems mentioned above if they innovate at the periphery instead. Yet, venturing away from core business also bears risks, and many companies have failed in doing so (Zook 2007). Once companies have found their strategic view towards innovation, they need to make the most of the sources of innovation that are available to the firm.

6.4.4 The Sources of Innovation

Von Hippel (1988) has pointed out that in contrast to common knowledge it is not always product manufacturers themselves who conceive innovations, but also users (i.e., customers) or business partners. The distribution of innovations by source depends on the expected profits from the innovation. In contrast to a manufacturer's innovation, user innovation only has to be useful to a very limited number of users (including the innovator himself). The innovators among users tend to be a highly concentrated group termed *lead users*. Hence, instead of relying exclusively on in-house R&D, a company may also follow the strategy to redesign products in order to facilitate innovation by lead users and consequently commercialise their ideas.

    Moreover, Von Hippel (1988) remarks that firms' engineers engage in informal trading of proprietary knowhow with other firms (and even competitors). In more general terms, the ability "to recognize the value of new, external information, assimilate it, and apply it to commercial ends is critical to [a firm's] innovative capabilities" (Cohen & Levinthal 1990, 128). This ability is known as *absorptive capacity*. Cohen & Levinthal (1990) argue that absorptive capacity is path

dependent, i.e. prior investments in knowledge further promote the acquisition and application of valuable knowledge in the same domain. Therefore, firms with own internal R&D departments do not only generate more original innovations, but should also find it easier to tap external sources of knowledge as a by-product.

Many firms have sought to compensate for their lack of competency with strategic alliances (see 4.4.3) to create and commercialise new business models (Kale & Singh 2009). For example, energy giant BP has entered several alliances with chemical firms as it lacked the required expertise to develop and commercialise biofuels quickly[15] (BP 2009). Furthermore, alliances can be designed "to generate innovations for an entire industry or to impose a new global standard" (Hage 1999, 611). However, it should be noted that managing alliances itself is challenging, with many alliances delivering little value (Kale & Singh 2009).

Chesbrough (2003a; 2003b) has popularised the term *open innovation* that contrasts with the old paradigm of closed (exclusively internal) innovation. Open innovation does not discard the concept of internal R&D; rather it proposes a blended innovation process equally relying on external knowledge as it has become more readily available in recent years. Chesbrough (2006; 2007) further propagates to move to *open business models* as a next step. He argues that increasing internal development costs and shorter product life cycles (i.e., reduced market revenue) can thereby be compensated with cheap external development and revenue from external commercialisation of intellectual property through licence fees, spin-offs, or divestments (Chesbrough 2007).

6.4.5   *Innovativeness and Absorptive Capacity*

The innovativeness of a firm heavily relies on the interfaces both between subunits and with external sources of innovation-relevant knowledge. If these interfaces do not possess either the required expertise or the capacity to effectively capture and redirect this knowledge, the absorptive capacity of the firm – and hence its innovativeness – will be limited (Cohen & Levinthal 1990). Diversity of background is essential as a broad range of expertise is necessary to relate to diverse emerging fields of knowledge (Cohen & Levinthal 1990; Hage 1999, 605). Cohen & Levinthal remark that gatekeepers can be used to "translate" knowledge domains if internal and external actors have little overlaps in expertise. In the case of rapid and uncertain technical change, an *organic structure* (Burns & Stalker 1994) of the organisation is believed to be preferential (Cohen & Levinthal 1990, 132). This means that work is conducted in the absence of strong formal hierarchies, methods, and duties. Communication tends to be more lateral than

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[15] This includes a partnership with chemical firm DuPont for the development of the advanced fuel molecule biobutanol, and a joint venture with Verenium, a biotechnology firm, to produce ethanol from lignocellulosic feedstocks. In addition, BP is investing US$ 500 million in its Energy Biosciences Institute (EBI) to explore applications of biotechnology to energy (BP 2009).

top-down compared to centralised, *mechanistic structures* (Burns & Stalker 1994, 5f.).

One problematic implication of the concept of absorptive capacity is that it cannot be built within a short period of time. Prior technological knowledge and complementing market knowledge are essential to recognise relevant external information as such and to be able to capitalise on it commercially (Lichtenthaler 2009). This issue is explored further based on practical examples in chapter 7.8.

Furthermore, absorptive capacity follows dynamics similar to some of the systems archetypes (see 4.5.3). Absorptive capacity can be viewed as a double self-reinforcing loop (Cohen & Levinthal 1990, 135ff.): On the one hand, the higher the level of absorptive capacity, the more efficient the accumulation of additional knowledge becomes. On the other hand, absorptive capacity increases the sensitivity to commercial opportunities and resulting expectations. Both factors increase the attractiveness of further investments in absorptive capacity. These virtuous circles can be further strengthened by organisational structures that foster learning. At the same time, inactivity results in an erosion of absorptive capacity, depending on the rate of change in the external environment.

Of course, the described dynamics also work in reverse. That is, if a company fails to build-up knowledge in a promising new field initially, catching up requires disproportionally high effort; the firm may become "locked out" (Cohen & Levinthal 1990, 136). Due to a lack of prior knowledge, missed opportunities may not even be recognised anymore. This effect may be prevalent in many companies that view sustainability as a public relations issue, but lack the technological and market-related knowledge to appreciate its true potential (Berns et al. 2009b, 5). The lock-out effect is further intensified when low absorptive capacity leads the firm to rely more and more on its existing knowledge; over time, it will develop high levels of competency in potentially inferior or outdated fields of knowledge. This will not only increase inertia but also result in a loss of diversity of backgrounds, thus speeding up the erosion of absorptive capacity. Cohen & Levinthal (1990, 135) remark that buying absorptive capacity via external hires, consultants, or acquisitions can be an option, but is limited to the extent that integration with the firm's activities is important for innovation and also takes time.

In conclusion, firms with high absorptive capacity will find it relatively easy to maintain a high level, but it is difficult to significantly improve absorptive capacity from a low level. It should be noted that absorptive capacity is also subject to limits to growth. Once absorptive capacity approaches its maximum, the marginal return from further improvement will become negative – despite the high efficiency in accumulating knowledge: there will just not be much valuable information left that has not been captured yet. Because absorptive capacity is usually restricted to specific knowledge domains (Cohen & Levinthal 1990, 148), a firm may face tradeoffs between research spending on the one hand, and the level of absorptive capacity and the number of active knowledge domains on the other hand. Next, the actual process of how innovation is created in practice is laid out.

6.5   Innovation Management

6.5.1   *Antecedents and Challenges of Successful Innovation Management*

Van de Ven (1986, 591) asserts that "From a managerial viewpoint, to understand the process of innovation is to understand the factors that facilitate and inhibit the development of innovations". These factors can either impact the innovativeness of the firm in general terms (see chapter 6.4.5), or only apply to specific innovations. For example, the failure of single potential innovations can be caused by many factors, but most fall into one of two broad categories: (1) the innovation is flawed (i.e., has an insufficient value proposition), or (2) it is implemented poorly. This suggests that high quality innovations which are implemented properly always get widely adopted and low quality ones do not. Unfortunately, reality does not quite confirm this train of thought as the example of the failed, but superior Sony Betamax video format, and the still prevalent "QWERTY" keyboard[16] illustrate (Sterman 2008). Explanations of such seemingly unjustified cases of success and failure, respectively, usually include factors like hidden costs, agency problems, or externalities. However, Sterman (2008) concludes that all-too often the managerial problem originates from mental models that neglect feedback processes, delays and other system dynamics elements, which also happen to play an important role in sustainability-related innovations. Systems thinking (see 4.5) can help understand these causal relationships.

McGrath et al. (1996) propose that, in addition to causal understanding, there are three further antecedents necessary to capture rents from innovations: The four antecedents are (1) causal understanding; (2) innovation team proficiency; (3) emergence and mobilization of new competences; and (4) creation of competitive advantages.

The antecedents build upon each other. McGrath and colleagues thus argue that lower-order antecedents (e.g., causal understanding) precede higher-order ones (e.g., competitive advantage), although they can still develop further in parallel with higher-order competencies. Hence, during more mature phases of the development process, the rent potential grows faster than in the beginning (McGrath et al. 1996, 393f.).

To fulfil the four antecedents mentioned above, innovation management must overcome four central kinds of problems as formulated by Van de Ven (1986): (1) "the *human* problem of managing attention", i.e. getting the attention focused on fostering new ideas instead of protecting existing practices; (2) "the *process* problem is managing new ideas into good currency", (3) "the *structural* problem of managing part-whole relationships" as multiple, heterogeneous (and sometimes loosely

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[16] QWERTY" refers to the order of keys on English language keyboards. This order is a remainder of the age of early typewriting in the 19th century. It was chosen in order to prevent typebar clashes. The Dvorak keyboard, an alternative designed to improve efficiency and reduce fatigue, has not been adopted widely despite its obvious superiority in the absence of the initial mechanical problems (David 1985).

coordinated) parts of the organisation are needed to implement the innovation, and (4) "the *strategic* problem of institutional leadership", thus "creating an infrastructure that is conducive to innovation" (Van de Ven 1986, 591, emphasis altered).

6.5.2 The Process of Innovation

Utterback & Abernathy (1975) have proposed a macro model of the innovation process according to which both the development of production processes and the development of products each go through three sequential stages: In the first stage the market is still immature, and new production processes tend to be uncoordinated and associated with frequent changes (that are often *not* innovations). For products, the focus lies on performance-maximising accompanied by frequent changes and high margins. As the market matures in stage two, the rate of process innovations reaches its peak and segmental leaps in process efficiency take place. Companies now try to maximise sales, and product innovations tend to be more geared towards differentiation. In the third and last stage, the whole production process becomes highly integrated and every change is costly due to systemic dependencies. Contingent on the context, this may concern single divisions or even several firms of a vertically fragmented industry. Products now tend to become standardised in order to minimise costs.

Utterback & Abernathy (1975) also propose that most innovations during the first stage are stimulated by market needs, by new technology in the second, and by production-related factors (for minimising cost) during the last stage. In contrast to process innovation, product innovation tends to fall continuously the more mature the market becomes. However, the conclusion that large companies should therefore produce relatively more process than product innovations has not been confirmed empirically – in fact the opposite seems to be the case (Damanpour 1996).

Johnson (2010, 55ff.) argues that there are several sequential shifts in the basis of competition: from performance to reliability, to convenience (may be skipped), to cost. Johnson also states that product, and later process innovations dominate the first two stages, yet that shifts to convenience and cost are often the result of business model innovations. However, neither of the authors seems to acknowledge that a shift *back* from cost is possible; yet empirical examples show that a shift towards sustainability as the basis of competition may facilitate just that (see chapter 7).

More often than not, individual product innovation is considered the output of R&D processes. The classic stages of the linear product innovation process in a manufacturing context have been identified as follows: (1) basic science; (2) design and engineering; (3) manufacturing; (4) marketing; and (5) sales. This *technology-push* view is contrasted with the *market-pull* model for more mature markets: (1) market need; (2) development (3) manufacturing; and (4) sales (Rothwell 1994, 8f.). However, as discussed above, innovation can have many different origins within and outside of organisations. Hence, the process stages listed above may also be performed or supported by external parties including suppliers, users, or partners (Von Hippel 1988). In addition to integrating external parties into the innovation process, its stages

are often conducted in parallel. The innovation process is increasingly geared towards speed and efficiency (Rothwell 1994, 15ff.).

Just because innovations are – by definition – new to the organisation, they are not necessarily conceived with big eureka. Instead, more or less structured processes exist to uncover potential starting points for innovation (Anthony et al. 2006). As a concrete example, Shapiro (2001, 33ff.) proposes seven dimensions of potential changes for process innovation. These changes can not only improve the economic, but also the environmental performance of a process:

1. *Rethink*: Always question why processes are the way they are.
2. *Reconfigure*: Consider ensuring quality early in the process and look at best practices from other industries; eliminate duplicated and low-value activities – as expressed concisely by Peter F. Drucker: "There is surely nothing quite so useless as doing with great efficiency what should not be done at all."(Drucker 1963, 54)
3. *Resequence*: Improve the sequence of tasks by doing them earlier (when better prediction is possible), by postponing them to become more flexible, by performing them in parallel, or by reshuffling them to reduce bottlenecks and dependencies.
4. *Relocate*: Consider relocating activities to customers, suppliers, closer together, or making them virtual.
5. *Reduce*: Use better information or simplify in order to reduce the frequency of tasks or to make better use of critical resources.
6. *Reassign*: Consider in- and outsourcing as well as shifting activities to suppliers or customers.
7. *Retool*: Consider new technologies, automation, leveraging additional competencies, and re-skilling of staff.

Specific considerations for managing the innovation process are laid out in the following. For this purpose, I distinguish the following four generic stages (that cover all kinds of innovations): idea generation, validation, realisation, and institutionalisation of innovation practices.

6.5.2.1   Idea Generation

An innovative firm enjoys a constant flow of ideas, with the promising ones being selected efficiently for further exploration and eventually commercialisation. Internal idea generation, trends from within the firm's industry as well as from other external sources can stimulate creativity. In fact, many disruptive innovations historically came from the periphery – with Apple (iPod, iTunes, iPhone, etc.) being just one of the most well-known examples of companies that repeatedly disrupted adjacent markets.

However, most companies are neither innovative in the sense described above, nor do their ideas lead to radical innovations very often. Three techniques briefly described in the following can be used to stipulate idea generation within a relatively short period of time: scenario planning, idea generation workshops, and

idea collection. However, long-term development of innovation capabilities (see section 6.5.2.4) should not be neglected, even if short-term idea generation methods are applied successfully.

Scenario planning

Pierre Wack, who pioneered scenario planning at Royal Dutch/Shell, circumscribes the idea behind scenario planning as follows: "Scenario planning aims to rediscover the original entrepreneurial power of foresight in contexts of change, complexity, and uncertainty." (Wack 1985a, 150) For this purpose, scenario planning addresses two major problems that many long-established companies have in common: overconfidence and tunnel vision (Schoemaker 1995). That is, "[s]cenarios address blind spots by challenging assumptions, expanding vision and combining information from many different disciplines" (Shell 2008, 16). Scenario planning workshops usually include executives, but need to be prepared thoroughly. A detailed explanation of how to use scenario planning to pave the way for new breakthrough innovations, as well as for the application of the other two techniques that follow, will be presented in chapter 9.

Idea generation workshops

Idea generation workshops depend both on the creativity and the expertise of its participants to generate a large amount of ideas within one or two days (approximately one idea per person and hour is realistic). During the workshops it is important to find the right balance between structure and freedom: People need some guidance in order to produce meaningful ideas, but also need to be stimulated to take new perspectives of thinking (Coyne et al. 2007). This can be achieved by providing mental bridges, e.g. by thinking in terms of how a highly successful company like Google would approach an issue (see Jarvis 2009). Another technique involves carefully chosen probing questions (Coyne et al. 2007, 73ff.). Like scenario planning, idea generation workshops require significant pre and post work to be effective.

Idea collection

Idea collection is based on the assumption that there are many good ideas floating around in the organisation that have just not been captured and combined in a meaningful manner. GE has successfully conducted energy "treasure hunts", a process developed by Toyota, to find ways to save energy throughout the organisation. These involved 181 locations, 2,600 employees and led to projects that reduced CO_2 emissions by 250,000 tons in 2006/07 (General Electric 2006, 31). The collecting of ideas does not need to be restricted to employees; suppliers or customers can also be a valuable source of innovation. GE also uses so called "dreaming sessions" that include key customers who can freely express their wishes in order to capture the next "big thing". GE's highly successful Ecomagination campaign, inter alia, originated from one of them (Fisher 2005).

Some of the world's largest *Crowd Ideation Events*, as this technique will be referred to in the following, are IBM's "Innovation Jams" (Bjelland & Wood

2008; IBM 2008a; IBM 2010c). In the 2006 event, 150,000 people participated in two 72-hour online sessions and posted more than 46,000 ideas in web forums and wikis. The first session was structured along 25 clusters of technologies in six broad groupings. After the first session, some 31 "big ideas" were selected through text mining software and substantial management time. Not surprisingly for such a gigantic online brainstorming session, discussions were hard to moderate and many ideas were completely useless; however, many ideas helped to realise incremental improvements to existing businesses, and some even led to the creation of new businesses.

Participants had already discussed many of the ideas brought forward before the Innovation Jam with their managers. The event gave them the opportunity to expose these ideas to a wider audience with different (and potentially critical) perspectives. Moreover, many small ideas could be combined with others so that they had an impact. However, as Edward Bevan, vice president at IBM Research and one of the organisers, remarks: "Idea generation is in some ways the 'easy' part […] of innovation, whereas advancing, refining and building support for those ideas is the really tough part." (Bjelland & Wood 2008, 40).

6.5.2.2   Idea Validation

With its Innovation Jam 2006, IBM did not only try to capture ideas, but also sought to speed up their commercialisation significantly. It was found that the second Jam session – which was supposed to refine selected business ideas – was ineffective in that format and hence was not repeated at later events. Apparently, this work is better done by managers, not by the crowd. Nevertheless, ten businesses funded with 100 million dollars have been created from the Innovation Jam 2006. The most remarkable one, not surprisingly, belongs to the environmental sustainability domain: "Big Green" started during the Innovation Jam as intelligent combinations of many different ideas and insights, and eventually became "the largest single initiative in IBM history: a billion dollar program to change radically how IBM and its customers use energy and other resources for computing." (Bjelland & Wood 2008, 36). Amazingly, the Jam revealed that IBM could make significant contributions to water management, one of the most significant environmental challenges of the future that no senior manager at IBM had considered so far. Nevertheless, after the Jam senior executives founded a new business unit. Many of its later members had contributed environmental ideas during the Innovation Jam (Bjelland & Wood 2008, 39). The Jam in 2010 even was dedicated to eco-efficiency (IBM 2010c).

However, not all of the initial ideas went on a path to quick commercialisation. Some ideas were transferred to R&D, and one of the ten big ideas was shelved after market demand turned out to be insufficient (Bjelland & Wood 2008, 36). A crucial part of innovation management is thus to abandon misjudged ideas early enough and refocus on more promising ones (Anthony et al. 2006, 111f.).

Challenges for engineering-driven firms

Even IBM, despite its reputation as a great innovator, has difficulties in commercialising its inventions. IBM and other technology-savvy companies can find it difficult to identify practical uses for their leading-edge technology. Or, members of engineering-driven firms wrongly assume that highly challenging technologies guarantee good profits if they can be tamed. Customers buy product and service functions – and not the scientific achievement behind them. Hence, evaluating how well a proposed innovation meets the market demand (potentially in reference to competitors' offerings), can be enlightening (McGrath et al. 1996). If a product, however, is designed to fulfil customer needs in a novel way (e.g., requires an unfamiliar usage pattern) or addresses previously unmet customer needs (rather than simply replacing a substitute product), even the most sophisticated market research may fail to accurately determine the prospects of the new value proposition (Von Hippel 1988, 102ff.). Thus, such benchmarks need to be applied very carefully with radical innovations – if at all. Von Hippel (1988, 106ff.) proposes to use lead users instead of typical users to explore novel and unfamiliar value propositions. Although lead users are also constrained by their past experiences, they are more familiar with future-oriented or experimental product uses. In contrast, Shapiro (2008) points out that the laggards who do not use a company's products yet may be an even more valuable source of information. After all, they are the target segment for game changing, discontinuous innovations (Christensen 1997).

Challenges for financially-driven firms

More financially-driven companies instead tend to be vulnerable to the pitfalls of financial analysis tools. Predicting the economic success of particular innovations is generally considered to be very difficult (McGrath et al. 1996, 401). Investment decisions for innovations based on DCF and NPV are problematic (see 6.4.3); in addition, most project teams know the required thresholds and "make the numbers work" by playing with the assumptions. However, it is in fact the assumptions that should matter most to executives, and not the largely speculative revenues or profits in five or ten year's time (Christensen et al. 2008).

For this reason, *discovery driven planning* (McGrath & MacMillan 1995) has been developed. Discovery driven planning turns the whole game around: the minimal financial requirements in the form of a reverse income statement are determined first. Based on this, assumptions that suffice minimum requirements are backtracked and tested for their viability. If the feasibility of the requirements can be credibly demonstrated (including implicit assumptions!), the project gets approved; if not, further study has to be done or it gets shelved. Analogously, pilots need to confirm the tracked assumptions and not necessarily meet financial measures. Especially with new business models that involve non-linear dynamics (e.g., word of mouth) small changes to underlying assumptions (e.g., contacts per user or conversion rates) can have huge effects on resulting financials that are thus prone for manipulation.

Whether a company is engineering- or financially-driven, the insights described above all underline how much value a systematic check of assumptions along the business model elements can add to the validation process – especially when the innovation is radical in nature.

Challenges related to strong uncertainty

Scenario planning is a useful tool to make decision makers aware of uncertainty and its potential implications. However, scenario planning is silent about which scenarios should be the basis for action, or to what extent. A solution to this problem may be applying *real options* to business strategy (Luehrman 1998a; 1998b). That is, a firm invests just to have the *option* to carry out a course of action at a later time if a certain future materialises (Amram & Kulatilaka 1999). However, Mintzberg et al. (2009, 65) remark that such a use of real options is difficult in practice: For one, the technical methods are not as well-established as in their original finance context. Moreover, in highly uncertain environments, i.e. when forecasting is impossible (a major reason for doing scenario planning in the first place), judging options can become very unreliable. Large option values with hidden underlying assumptions can thereby change the recommendation without deciders realising it (Bierman and Smidt 1993, 486). And lastly, the real options approach does not work well for any Green Business Model Transformation that requires all-or-nothing decisions. For example, GE could not sensibly have decided to implement only part of Ecomagination as the majority of benefits stemmed from the consistent whole of the initiative. In fact, due to reinforcing feedbacks, many business models should only be implemented fully-fledged or not at all. In other cases, though, making a big entrepreneurial bet can be avoided through business model pilots. For business models that *might* become dominant in the future, but whose time has not yet come, a company may opt for a precautious course of action and build competencies that are needed. Yet, due to the limited general applicability to Green Business Model Transformations, the real options approach is not pursued further in the management framework of chapter 9.

6.5.2.3   Idea Realisation

Even when a firm has correctly validated the assumptions of an innovation investment, success is not guaranteed. In some cases, assumptions about the innovation idea are correct, but the assumptions about the own implementation capabilities are too optimistic (McGrath & MacMillan 1995). McGrath et al. (1996, 400) remark that innovation managers tend to focus on technical challenges and frequently neglect critical economic success factors like team proficiency and new required competencies. The process of building competencies is difficult to measure and therefore also challenging to manage. Even if managed well, building significant new competencies takes time; a partnership may be the best way to fill the gap when time is critical.

In reference to Schön (1971), Van de Ven (1986, 592f.) emphasises the socio-political aspects of innovations: Ideas do not induce lasting change unless they

activate political debate and become a means to gain influence and resources. Before an idea reaches legitimisation and becomes taken for granted, it can fall victim to short-term focus and problem evasion as described in the garbage can model (see chapter 6.2.6). Project management tools can effectively be applied to address these issues (Huber 1984, 938; Van de Ven 1986, 593f.).

The innovator's job, however, is not even done when the innovation is implemented and working according to the project plan. Especially with respect to process and administrative innovations, the termination of now obsolete procedures need to be actively managed in order to avoid "shadow" structures and activities that undermine the success of the innovation (Van de Ven 1986, 600f.).

Another common pitfall is ignoring the fact that the environment is changing, too. Assumptions may become invalid as competitors and the broader business environment evolve. Continuous monitoring combined with adaptability is critical. Speed is important, too, as opportunity windows may close quickly. With reference to the great speed at which Japanese manufacturing firms used to convert ideas into commercial products, Simon (1993, 140) proposes to involve other relevant functions early in the development process. This way, R&D is less likely to come up with products that are expensive to manufacture or miss the customers' needs. However, R&D must be careful not to sacrifice the new product's distinctiveness in order to comply with everyone's requests.

One important domain to mention here is marketing and sales. For example, an ill-conceived launch of a revolutionary new green product can break the whole business model. The respective growth dynamics that marketing and sales can activate have been laid out in chapter 4.5.4.

As a last caveat, innovation managers need to be aware of the fact that commitment – often praised as a pivotal enabler for true breakthroughs in organisations – has a flip-side: Innovators can become so enthusiastic that they are viewed as fanatics by people outside their inner circle (Senge et al. 1999). This may materialise in the form of the use of special language (e.g., project-specific terms) and ignorance with respect to the interests of those affected by the change. These in turn will react with more or less directly provoked resistance. It is thus important for innovators to stay in constant contact with the wider organisation and remain open for feedback in order to ensure a smooth diffusion of the innovation (Senge 2006, 296ff.).

6.5.2.4 Institutionalisation of Innovation Practices

Firms should generally strive to foster innovation practices that overcome the human tendency to shirk from decisions under high complexity and uncertainty. Failure to do so can result in gradual performance erosion. The famous frog analogy applies here: If a frog is thrown into boiling water, it immediately jumps back out. Apparently, if the frog is put into cold water which is then heated slowly, it stays in the water until it cannot escape anymore and eventually dies after the water starts boiling. In such situations, innovation efforts equal crisis management, which is argued to frequently produce "mistakes" instead of

innovations (Van de Ven 1986, 595f.). Even if the "crisis innovations" are successful, a continuously well-performing innovation practice is obviously better than the recurring need for a serious crisis to spur innovation.

Institutionalising innovation practices is also relevant for Green Business Model Transformations. Usually these entail the strategic decision to venture into a domain which the company is not fully familiar with and that requires significant learning. Moreover, new business models often require substantial optimisation, even if the introduction was successful.

Continuous environmental scanning

Simon (1993) emphasises the importance of institutionalised intelligence activities that connect the firm with its environment in order to anticipate the future. Firms in dynamic industries tend to have internalised the fact that they have to generate new ideas well before the old ones lose their traction. In a study of UK-based companies from various sectors (automobiles, book publishing, investment banking, and life insurance), Pettigrew & Whipp (1991, 104ff.) found that environmental assessment is one of the central distinguishing factors of high-performing firms. Instead of technical, one-time efforts to assess the environment, these companies are open and continuously learn on all levels.

Therefore, R&D and customer-facing functions should routinely be involved with the external environment in order to capture promising new trends. Other functions like marketing – although maybe not as critical in this respect – should foster two-way communications as well. Moreover, environmental scanning activities need to be differentiated enough to recognise the different needs and interests of various stakeholder groups (Van de Ven 1986, 594): If relevant distinctions are "averaged out", important opportunities as well as potential sources of resistance may be overlooked.

Organisational structures and innovation

Anthony et al. (2008) present four organisational structures that are suited to support innovation in different contexts (but can be used in parallel): First, *training units* complement the infrastructure for innovation and ensure that the required skills are available. Second, *funding or oversight mechanisms* can be used to champion ideas, fund them, and remove internal obstacles. They may as well oversee the discovery-driven planning process. Third, *incubator groups* may be used to rapidly develop innovations from a first idea to a business concept which is then reintegrated into the core organisation. Fourth, *autonomous growth groups*, composed of innovation generalists and high-potential leaders, can be used to advance innovations that are incompatible or even conflicting with the organisation's core (Anthony et al. 2008, 49). As radical (and also architectural) innovations entail managing an unfamiliar, complex recombination of business model elements, the innovation unit needs to be able to take a holistic view. According to Van de Ven (1986, 598ff.) this may be best achieved if the

innovation unit is not only autonomous, but if its members represent the rich variety of the relevant business environment and if everybody understands the overall concept of the innovation beyond his or her functional specialty.

However, due to economic considerations the degree of conflict between the old and the new business model should not be the only relevant criterion whether to keep the innovation effort separate or integrated: The *strategic relatedness* of the business models, i.e. whether they address similar markets, determines the potential for synergies between them (Markides & Charitou 2004). Markides and Charitou argue that a separate unit as described above will usually be best if conflicts are serious and markets do not overlap. Even then, senior management should coordinate the business models in order to realise at least some synergies (Markides & Charitou 2004, 26; O'Reilly III & Tushman 2004). If the markets are similar, however, synergies may justify re-integration of the new unit once the business model has matured. In this case, the firm should try to avoid that the two organisations diverge from each other more than necessary (e.g., by aligning IT systems, transferring managers or conducting company-wide events) (Markides & Charitou 2004, 30f.). On the other hand, if the new business model does not threaten the core business and no markedly different mindset or steering mechanisms are required, it will usually be expedient to leverage existing resources as much as possible and integrate the new business model from the beginning (although interferences from the old business model still need to be managed). Only if the strategic overlap is low it makes sense to separate them later to increase autonomy in order to compete more effectively (Markides & Charitou 2004, 31f.).

Steering innovativeness within the firm

Some firms successfully manage decentralised innovation through challenging targets and smart incentivising for divisions. For example, GE has set stretching revenue targets for its Ecomagination portfolio (products internally certified to be ecologically friendly) and provided funding to spur innovation with green products (General Electric 2008). Setting some focus can actually spur innovation rather than dampen creativity – as long as it is not too narrow regarding the means to achieve it. Firms should generally attempt to maintain a balanced portfolio of innovations that improve the core business, extend it, and enable growth in novel areas (Anthony et al. 2008). Moreover, the traditional "big bets" approach to innovation, in which a small number of ideas receive significant funding based on forecasts and business case analysis, can be complemented with an evolutionary learning approach (Shapiro 2008): a large amount of ideas each receive limited funding initially. Then, once early signals become apparent for which ideas show good prospects, less promising ideas can be eliminated. During the next phases, the remaining ideas receive more funding until a few high-potential ideas emerge from the selection process. Due to the large amount of considered opportunities, informed selection and the cumulative funding process, the likelihood of success is high despite moderate financial investment.

It is important for senior management to withstand the temptations of neglecting long-term performance in order to boost short-term results as the earnings-per-share thinking prevalent in many established companies suggests (Christensen et al. 2008). This also means establishing a positive (but sensible) attitude towards risk; otherwise only incremental, low-risk innovations will be supported. Eventually, radical innovations may not even be suggested anymore – they become known to be rejected anyway.

Moreover, management should seek to cultivate innovators within the organisation (Cohn et al. 2008): Once they have been identified (e.g., via talent management programmes), they need to be developed through gradually more challenging innovation assignments. Mentoring, peer networks and placement in a high-impact position maximises innovators' effectiveness. For that reason some companies place them as an "innovation hub" outside of the normal line organisation.

6.5.3   Using Sustainability as a Catalyst for Innovation

Fussler (1996) was among the first to use the term *eco-innovation* in literature, suggesting that firms should focus on innovations fuelled by environmental sustainability issues. Nidumolu et al. (2009) argue that sustainability has meanwhile become the key driver for innovation. They claim that innovation management and sustainability management may increasingly become synonymous. This suggests that institutionalising corporate sustainability in organisations (see Jennings & Zandbergen 1995) should not only improve the environmental performance of a firm, but also its innovativeness. Nidumolu et al. (2009) propose to manage such innovation based on a five-stage model that involves building cumulating competences. Each stage offers unique innovation opportunities. In the first stage, firms start to view compliance as an opportunity. They can then move on to making their value chains sustainable (stage 2), designing sustainable products and services (stage 3), developing new business models (stage 4), and finally arrive at what the authors call "creating next-practice platforms" (Nidumolu et al. 2009, 64). This last stage corresponds to revolutionary green business models that impact more than just a single market.

The sequence and implied ranking order of types of sustainability innovation proposed by Nidumolu et al., however, is overly simplistic. For example, green innovations in value chains can be much more challenging and significant than certain green product innovations. Apart from that, they are certainly correct to infer that green business model innovations of various types require significant competences – competencies that many companies do not possess today (see also Berns et al. 2009b, 18f.).

Eco-innovations – at least if understood broadly – cannot be reduced to their direct environmental impact (see Esders 2008, 23ff. for a discussion of definitions). In fact, some eco-innovations have far-reaching systemic effects (Andersen 2008). For firms that undergo a Green Business Model Transformation this means that they should try to understand, and possibly steer, these effects in their favour. As concrete examples greatly facilitate exploring this complex topic, however, it will be part of chapters 7 and 8.

This chapter provided the theoretical background for understanding organisations, change, and innovation. Respective practical implications and tools described in management literature have also been discussed. Whenever appropriate, the relevance of sustainability for these topics has been highlighted. In addition, environmental sustainability issues and various means to improve them have been laid out in chapter 3.3, business model change in 4.6, and a variety of business model prototypes that exploit these means in chapter 5.5. Combined with the insights on innovation and change presented in this chapter, all theoretical and conceptual groundwork necessary to create, implement, and operate innovative green business models is therefore provided, and ready to be synthesised into a concise management framework (chapter 9). However, to ensure that this synthesis does not suffer from abstract inferences that do not conform with reality, a broad survey on Green Business Model Transformations has been conducted. The remainder of this book thus offers novel insights on opportunities and challenges arising from Green Business Model Transformations, derived from management practice.