

Philipp Bubenzer

Innovation, Identity and Identification

Understanding and Managing Innovative Change
from an Organizational Psychology Perspective

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With a foreword by Prof. Dr. Holger Ernst

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To
Andrea

FOREWORD

Innovations have become the lifeblood of success for companies in most industries. However, the innovative efforts of companies continue to be plagued by high failure rates. Innovations often fail due to a lack of internal support. Organizational research has shown that employee resistance arises when an innovation is perceived to threaten the core of the organization, its identity. While prior work has produced abundant evidence that innovations can be hampered by the perceived organizational identity, there is a lack of understanding of how to approach and solve this dilemma. It remains unsolved how employees can be led to truly identify with identity-incongruent innovations and fully support them.

The present dissertation contributes substantially towards closing this significant research gap. Philipp Bubenzer draws on current organizational psychology theories and develops a new conceptual framework which addresses, firstly, why perceptions of organizational identity and innovations are interrelated, secondly, how these perceptions induce member identification with innovations and, thirdly, to what extent identifying with innovations leads to desired consequences in terms of member behaviour and the innovation's market performance.

Philipp Bubenzer tests his hypothesized framework in several large-scale empirical studies based on survey and archival company data. He can show that members do not simply 'resist' or 'favour' an innovation, but rather differentially identify with an innovation depending on its perceived prototypicality, i.e. its similarity to members' ideals. Furthermore, Philipp Bubenzer demonstrates that the perceived prototypicality of an innovation can be favourably influenced by addressing key motives of the organizational members' social identity. These determinants are of critical importance as they explain more than half of the variance among employees' identification with innovations. Moreover, Philipp Bubenzer finds that his social identity-based concept of identification with innovations matters greatly for the innovation's performance: It predicts up to a third of innovation performance. As such, this dissertation indicates that the pro-active management of identification is an important success factor of innovations. Finally, to support executives in achieving employee identification with innovations, Philipp Bubenzer derives an innovation-identity toolset consisting of a new portfolio matrix and a stylized communication process.

Overall, the dissertation contributes significantly to scholarship in organizational behaviour and innovation management. It represents the first theoretical and empirical work which introduces a social identity perspective to the adoption of new product innovations by employees. The dissertation's commendable methodological rigour gives credibility and weight to its empirical findings. Its theoretical and managerial implications are far-reaching for theory and practice. I therefore highly recommend this dissertation to both academics and managers.

Prof. Dr. Holger Ernst

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Philipp Bubenzer

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LIST OF ABBREVIATIONS

AMOS	Analysis of moment structures
ADF	Asymptotically distribution free
AGFI	Adjusted goodness-of-fit index
AVE	Average variance extracted
BFI	Bentler's fit index
CA	Cronbach's Alpha
CEI	Construed external image
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CR	Construct reliability
Df	Degrees of freedom
DV	Dependent variable
EFA	Exploratory factor analysis
EFAFL	Exploratory factor analysis factor loadings
E.g.	For example
FIML	Full information maximum likelihood
FLC	Fornell-Larcker criterion
FLR	Fornell-Larcker ratio
GFI	Goodness-of-fit index
GLS	Generalized least squares
HealthCo	Health Corporation
ID	Identity
I.e.	That is
IIC	Innovation-identity-communications
IIM	Innovation-identity-matrix
Inno1	Innovation one (launched)
Inno2	Innovation two (announced)
IR	Indicator reliability
KMO	Kaiser-Meyer-Olkin criterion
MLE	Maximum likelihood estimation
NFI	Normed fit index
NPD	New product development
OIC	Organizational identity construction
OID	Organizational identity
OLS	Ordinary least squares
ORG	Organization
p	Probability
PCT	Personal construct theory

RMSEA	Root mean square error of approximation
RMSR	Root mean square residual
S.E.	Standard error
SEM	Structural equation modelling
SBU	Strategic business unit
SCT	Self categorization theory
SEM	Structural equation model
SIT	Social identity theory
TLI	Tucker-Lewis Index
TQM	Total Quality Management
WLS	Weighted least squares
χ^2	Chi-square
χ^2_d	Chi-square difference

“And let it be noted that there is no more delicate matter to take in hand, nor more dangerous to conduct, nor more doubtful in its success, than to set up as the leader in the introduction of changes.

For he who innovates will have for his enemies all those who are well off under the existing order of things, and only lukewarm supporters in those who might be better off under the new.”

((Macchiavelli, [1513] 1992) p.13)

(Niccolò di Bernardo dei Machiavelli, Il Principe)

1. Introduction

1.1. Organizational identity and innovation: Relevance and dilemma

In the early 1990s, James Collins and Jerry Porras of Stanford University set out to uncover what it takes to build an enduring great company from the ground up (Collins & Porras, 1994). For six years, they closely studied the iconic giants of the twentieth century — including Procter & Gamble, American Express, Johnson & Johnson, General Electric, and Sony — to find the common characteristics that explained their lasting success. One of their central discoveries was that these companies all had a ‘core ideology’: a set of guiding principles and a fundamental reason for being. From their rich insights into these companies, Collins and Porras concluded that having a core ideology represented a critical determinant for lasting superior company performance (Collins & Porras, 1994). The core element that they described closely mirrors what organizational research has come to regard as an organization’s identity: a shared understanding of the central, enduring, and distinctive character or essence of the organization among the organization’s members (Albert & Whetten, 1985). If organizational identity had been a key driver of lasting success in the past, its importance has arguably grown in recent years because market conditions have become increasingly turbulent across many industries (D’Aveni, 1994; Wiggins & Ruefli, 2005). In such environments, a clear sense of the organization’s identity is gaining further importance because other traditional sources of stability and guidance falter and lose their adequacy. For instance, organizational structures and processes become obsolete as firms struggle to adapt to increasing instability by flattening out their hierarchies, promoting teamwork, and outsourcing non-core activities to achieve the needed organizational flexibility. But not only the firms’

organizational structure, also their competitive positions erode faster in unstable markets and long-term strategies lose their effectiveness as guiding lights for the organization. Thus, for an organization to remain a coherent and coordinated entity in such environments, “...it becomes more important to have an internalized cognitive structure of what the organization stands for and where it intends to go — in short, a clear sense of the organization’s identity” ((Albert, Ashforth, & Dutton, 2000) p.13). The more turbulent the environment, the more the company must “...reside in the heads and hearts of its members” ((Albert et al., 2000) p.13).

If market conditions have raised the importance of a strong organizational identity that is personally internalized by its members, it is not surprising that theories of the firm have also progressively focussed on internal, core aspects of the organization and approached them from an increasingly subjectivist perspective. While early approaches, such as governance- and contract-based theories by Coase (Coase, 1937) or Williamson (Williamson, 1975; Williamson, 1981; Williamson, 1985), were highly predicated on an external and objectivistic view of the firm, propositions of late, such as resource- or capability-based theories by Penrose (Penrose, 1959), Barney (Barney, 1991), and Teece and his colleagues (Teece, Pisano, & Shuen, 1997) already took on a more internal perspective. More recent approaches, such as attention- or cognition-based theories by Ocasio (Ocasio, 1997), Kogut and Zander (Kogut & Zander, 1996), Nooteboom (Nooteboom, 2003), or Fiol (Fiol, 2001), have adopted a mostly internal and subjectivist perspective. Among these more recent theories, identity has been proposed as a key foundation for a general theory of the firm: “*What makes a firm and its boundaries distinctive is that the rules of coordination and the process of learning are situated not only physically in locality, but also mentally in an identity*” ((Kogut & Zander, 1996) p.515). In their highly read article, Kogut and Zander theoretically develop how identity, coordination, and learning jointly constitute ‘what firms do’ and suggest that organizational identity is critical to coordination and learning (Kogut & Zander, 1996). Organizational research has specifically proposed various ways by which organizational identity can act as a source of competitive advantage (Fiol, 1991, 2001) and lead to superior company performance. For instance, it has been suggested that organizational identity serve as a coherent guide for an organization’s strategy (Ashforth & Mael, 1996), strategic orientation (Nag, Corley, & Gioia, 2003), capacity for strategic interpretation and

change (Gioia, Schultz, & Corley, 2000; Gioia & Thomas, 1996), and boundaries in the competitive environment (Santos & Eisenhardt, 2005). Moreover, organizational identity has been proposed as a means to inspire members to identify with the organization. The members' identification with their organization has been defined in various ways (for reviews see (Pratt, 1998; Whetten, 2007)), one of the earliest and widely used being "*the degree to which a member defines himself or herself by the same attributes that he or she believes define the organization*" ((Dutton, Dukerich, & Harquail, 1994) p.239). Organizational identification has been shown to motivate organizational members (Ellemers, De Gilder, & Haslam, 2004), entice them to seek solutions to environmental and internal threats (Dutton & Dukerich, 1991; Reger, Gustafson, Demarie, & Mullane, 1994), increase their loyalty (Mael & Ashforth, 1992), induce organizational citizenship behaviours (Bergami & Bagozzi, 2000), and result in better overall job performance (Carmeli, Gilat, & Waldman, 2007; van Knippenberg, 2000). Not least, organizational research has begun to suggest how the twinned concepts of organizational identity and identification can be useful beyond the organization's core, for instance, in managing stakeholder relations (Scott & Lane, 2000) or customers' identification with the organization which, again, drives their cooperative behaviour (Dukerich, Golden, & Shortell, 2002) and supports the organization's performance (Ahearne, Bhattacharya, & Gruen, 2005; Bhattacharya, Rao, & Glynn, 1995). In sum, it appears that in today's increasingly turbulent market environments, an organization's identity can serve as a key source of competitive advantage, underpinning the company's performance with guidance, coherence, and stability while serving as a target of identification for its members and stakeholders.

However, an organization's identity can also turn into a source of competitive weakness when its attributes become outdated (Fiol, 2001, 2002). When adaptation and change is needed, the stabilizing nature of organizational identity can become dysfunctional and turn into a core rigidity. A large volume of research has shown that organizational identity can evolve into a barrier to timely organizational change by constraining adequate interpretations and corresponding actions (Ashforth & Mael, 1998; Brown & Starkey, 2000; Dutton & Dukerich, 1991; Elsbach & Kramer, 1996; Fiol, 2002; Fiol & O'Connor, 2002; Nag, Corley, & Gioia, 2007; Pratt & Foreman, 2000; Reger et al., 1994). Change is impeded when organizational members perceive new initiatives as threats to the organization's current identity and resist

them with denial, misinterpretation, or rejection (Brown & Starkey, 2000). Innovations are especially prone to resistance as, after all, a true innovation “*rarely fits into the scope, objectives, goals, technologies, processes — even the markets — of today. The most important innovative opportunities always fall outside existing definitions — and thereby outside the ‘assigned scope’ of an existing decentralized product business*” ((Drucker, 2007) p.800). Innovations are broadly defined here as “*the intentional introduction and application within a role, group, or organization of ideas, processes, products, or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, the organization, or wider society*” ((West & Farr, 1990) p.9). The more innovative a change is, the higher the likelihood that it will be perceived as detrimental to the current organizational identity and the stronger the opposition by organizational members. Such identity-induced resistance can be disastrous for a company. For instance, Firestone’s identity as an Akron-based ‘family’ company (Sull, 1999a; Sull, Tedlow, & Rosenbloom, 1997) had been instrumental in its success as a leading provider of bias tires. However, when radial tires invaded the market and bias tire sales declined, the very same identity hindered Firestone from the timely closure of its costly bias tire production sites in Akron (Sull, 1999a). Another case in point: Laura Ashley’s identity represented traditional British values and a romantic Welsh countryside lifestyle — a key ingredient of its early success. The company’s financial performance plunged when female clothing needs and tastes changed in the 1980s and did not recover, arguably because Laura Ashley’s original identity thwarted the company’s efforts of adapting to altered market trends (Sull, 1999b). Finally, Polaroid represents a third example where the organizational identity became a major impediment for necessary innovative change. Polaroid failed to progress to the digital era even though the company’s very success had been built on stunning innovations in film development. When digital photography emerged as a disruptive technology, Polaroid was quick to establish a significant research and development program for digital photography. However, Polaroid’s identity as a ‘film’ company impeded a full adoption and focus on these new technologies and products when its traditional business started to falter (Tripsas & Gavetti, 2000). Polaroid declared bankruptcy in 2001. These examples illustrate how organizational identity can turn from a source of competitive advantage into a severe constraint for an organization’s innovativeness.

However, innovation has become essential to a company's survival in today's volatile markets. On the average, more than 30% of sales and profits are generated by products which were launched within the past five years (Griffin, 1997); in best practice companies, the rate is close to 50% (Hauser, Tellis, & Griffin, 2006). Moreover, innovation has consistently been found to enhance not only a company's financial performance, but also its internal efficiency (Vincent, Bharadwaj, & Challagalla, 2005). At the same time, innovative efforts are costly because they are prone to failure. Christensen and Raynor suggest that *"over 60 percent of all new product development efforts are scuttled before they ever reach the market. Of the 40 percent that do see the light of the day, 40 percent fail to become profitable and are withdrawn from the market. By the time you add it all up, three-quarters of the money spent in product development investments results in products that do not succeed commercially."* ((Christensen & Raynor, 2003) p.73). In view of both, the importance of innovations for a company's performance as well as their high rates and costs of failure, it is not surprising that 80% of the executives surveyed in a global study by Bain & Company considered 'becoming more innovative' a top three priority (Rigby & Zook, 2002). In addition, more than 90% of them viewed their company's innovative capability as critical for future competitive advantage (Rigby & Zook, 2002).

When attempting to integrate the insights above, a dilemma emerges: Both organizational identity and organizational innovation have become increasingly critical for performance and survival in today's turbulent environments. Yet, they appear to be fundamentally opposed, as they seek to achieve antagonistic goals. While organizational identity aims to provide stability and continuity for the organization, innovation requires organizational adaptation and change. The exemplary cases of Firestone, Laura Ashley, and Polaroid testify that this tension is not merely theoretical, but can lead to a company's debacle. A solid but outdated organizational identity can effectively shun a company from appropriately perceiving, developing and successfully launching necessary innovations. If an innovation questions aspects of a cherished organizational identity, organizational members often react with denial, misinterpretation, or neglect, leading to resistance and, ultimately, the failure of the innovation. Thus — as long as it is adequate — a strong organizational identity may be beneficial for guidance and stability, but — when

change is needed — it may prevent organizational members from embracing innovations and fully identifying with them.

The main challenge therefore consists in successfully managing both identity and innovation. If organizational identity is the rudder that provides direction and coherence in turbulent environments, what will its role be when the organization attempts to develop and implement innovative change? How could an organization simultaneously support stability and facilitate innovation? In order to solve this dilemma three central issues need to be addressed: Firstly, an understanding is needed why and how organizational identity and innovation are interrelated in members' perceptions. Secondly, it must be clarified how these perceptions can lead a member to identify with an innovation. Thirdly, verification is needed whether a member's identification with an innovation truly leads to desired consequences in terms of member behaviour and, ultimately, the innovation's market performance. Interrelating and validating these issues within a single, comprehensive framework will allow shaping managerial recommendations on how to successfully handle two of an organization's most important elements in today's rough markets: identity and innovation. This study proposes to explain how perceptions of an organization's identity and innovation are interrelated, and how they can be managed so that organizational members strongly identify with the innovation and strive for its success in the marketplace.

1.2. Research gaps and main contributions

Very early on, organizational research has recognized the importance of organizational identity in explaining change processes in organizations (e.g., (Ashforth & Mael, 1998; Brown & Starkey, 2000; Dutton & Dukerich, 1991; Elsbach & Kramer, 1996; Fiol, 2002; Fiol & O'Connor, 2002; Gioia & Thomas, 1996; Gioia, Thomas, Clark, & Chittipeddi, 1994; Nag et al., 2007; Reger et al., 1994)). However, three central questions have remained unanswered, to which this thesis contributes theoretical concepts and empirical validation.

First, it is unresolved whether an organization's identity always necessarily constrains innovative initiatives, and which aspects of the organizational identity may

cause resistance to or acceptance of innovative change. In short, there is a lack of understanding of the identity-related *determinants for the acceptance of innovative change initiatives*. Most prior research has implicitly assumed or explicitly argued that members will generally resist the change initiatives which they perceive will modify the organization's current identity (Ashforth & Mael, 1998; Brown & Starkey, 2000; Dutton & Dukerich, 1991; Elsbach & Kramer, 1996; Fiol, 2002; Fiol & O'Connor, 2002; Nag et al., 2007). Thus, organizational identity has primarily been regarded as an impediment to change which needs to be overcome. Hardly any research appears to have considered that an organization's identity may also be capable of supporting change initiatives.

Only two studies have suggested that an organization's identity may also be capable of supporting change initiatives. They are later discussed in detail, and will only be briefly exposed here. Both studies differentiate between members' current perceptions and their idealized expectations of organizational identity. The work of Gioia and Thomas (Gioia & Thomas, 1996) shows that, by projecting desired future states of the organizational identity, members can be led to interpret organizational issues in a strategic way that is conducive to organizational change. Reger and her colleagues (Reger et al., 1994) develop the concept of an 'identity gap' that represents the cognitive distance between members' current and idealized organizational identity perceptions. They suggest that widening the gap creates stress and thereby facilitates the acceptance of change initiatives. These studies offer two pivotal contributions. Firstly, they propose that an organization's identity, in its current form, is not necessarily rigid constraint, but may be malleable. Secondly, they show that idealized forms of the organization's identity can be used to facilitate change.

However, these studies do not explain *why* certain projected organizational identities and their related change initiatives appeal to organizational members while others are fiercely resisted. In consequence, *how* a projected organizational identity and its related change initiatives can be made desirable to the organization's members has yet to be established. In short, the identity-based determinants of members' acceptance or rejection of innovative change have yet to be understood. This thesis is the first to develop organizational identity-based determinants for the acceptance

of innovative change from a social identity perspective (chapter 3). These determinants extend prior work by providing an understanding how organizational identity perceptions can serve as enablers of innovative change, not constraints to it. The present study also contributes empirically by providing the first large-scale quantitative evidence for these novel theoretical propositions.

Second, an in-depth, social psychological understanding of members' acceptance or rejection of an innovative change is lacking. Prior organizational research has limited itself to an oversimplified view of members' resistance to change, both in the organizational change literature (for a review see (Piderit, 2000)) and the innovation literature (for a review see (King, 2003)). Nigel King (King, 2003) confirms that "the involvement of organizational members (other than senior managers and other key decision-makers) in innovation processes is a neglected research area. There is a considerable amount of work on resistance to change, but this presents a rather partial and restricted view of organizational members' experiences" ((King, 2003) p.620). He further suggests: "The problem is that most of this literature has either treated organizational member involvement as a black box (between the 'inputs' of structure, leadership, resources, etc. and the 'output' of innovation), or has reduced its complexities to the single issue of 'resistance'" ((King, 2003) p.620). Piderit concludes that "we should retire the phrase 'resistance to change', and I advocate a new wave of research on employee responses to change, conceptualized as multidimensional attitudes." ((Piderit, 2000) p.789). In order to come to a richer understanding of members' involvement with organizational change, Piderit suggests that research build on the socio-psychological notion of a member's attitude (Piderit, 2000).

This thesis follows Piderit's suggestions and provides the first theoretical conceptualization of organizational members' attitudes towards innovations, which is based on the social identity approach as an important social psychological paradigm (Haslam, 2001). Specifically, the thesis explores how insights from the social identity approach can be fruitfully applied not only to social elements of an organization, such as its members, teams, or departments but also to its artefacts, such as its product innovations. Chapter 3 begins this theoretical development by conceptualizing identification with innovations as the congruence between the image a member holds

of the innovation and the image he holds of himself as an organizational member; i.e., his social identity. Chapter 4 deepens the theoretical reasoning of chapter 3. It explains the underlying psychological processes of identifying with innovations by resorting to categorization theory (Rosch, 1978), a theoretical pillar of the social identity approach (see chapter 2.2.3.). Categorization principles have previously been applied to social elements of organizations, such as individuals and groups (for reviews see (Hogg & Terry, 2000) (Hogg, Abrams, Otten, & Hinkle, 2004)); here, however, they are applied to an organization's product innovations. Extending the insights of categorization theory from social elements to artefacts of organizations is new to organizational research. In addition, the specific application of categorization principles to product innovations also represents a novel theoretical contribution to innovation literature. In short, the second major contribution of the present thesis to organizational and innovation literature consists of proposing the first social identity-based understanding of members' identification with innovations. The theoretical proposition, operationalization, and empirical validation of this novel concept deliver an enriched, social psychological explanation of how organizational members come to accept or reject innovations.

Third, an understanding of the consequences of member identification with innovations is also missing. After a new perspective on members' attitudes towards innovations has been developed, the next question that must be answered is how comprehensively relevant the new approach is; that is, to what extent it is capable of explaining the members' innovation-related behaviour and the innovation's resulting market performance. Because the hitherto developed concept of a member's identification with an innovation is novel, its consequences have also not been studied yet. Thus, each hypothesized consequence of identifying with innovations that is conceptually derived and tested in chapter 5 represents a theoretical and empirical contribution in itself. However, in order to additionally contribute to an ongoing theoretical discussion, the chapter specifically shows how this novel concept can address and extend prior research on the adoption of innovations by boundary spanners (Thompson, 1967). This theoretical debate at the intersection of marketing, innovation management and organizational research has been chosen because it allows a straightforward derivation and empirical testing of the consequences of identifying with innovations. More specifically, the notion of *adoption* can be readily

integrated with and refined by this study's social psychological understanding of identification. Adoption has been defined as "*the process through which an individual or other decision-maker unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision*" ((Rogers, 1983) p.163). Clearly, the members' attitude formation toward the innovation represents a decisive element of the adoption concept. As to *boundary spanners*, they are highly relevant to the successful launch of innovations (di Benedetto, 1999); a good launch is critical to the overall performance of new product innovations (Hultink, Griffin, Hart, & Robben, 1997; Hultink, Hart, Robben, & Griffin, 2000; Hultink & Robben, 1999; Kleinschmidt, de Brentani, & Salomo, 2007). Moreover, it has been suggested that identity and identification issues are of special importance at an organization's boundaries (Bartel, 2001; Elsbach, 2001; Pratt, 2000; Rousseau, 1998), but boundary spanners have seldom been the subject of organizational identity and identification research (for recent exceptions see (Ahearne et al., 2005; Bartel, 2001; Richter, West, van Dick, & Dawson, 2006)). Finally, *new products* appear especially suitable to explore identification consequences because their market performance can be more parsimoniously related to boundary spanners' attitudes and behaviours than, for instance, service or process innovations.

While research on innovation adoption at industrial and organizational levels has been well-established for decades (Gatignon & Robertson, 1985, 1989; Norton & Bass, 1987; Rogers, 1983), studies which address individual innovation adoption within organizations are somewhat scarce and typically focus on the adoption of new technologies or systems that are externally developed and brought in to the members' workplace (for a review see (Frambach & Schillewaert, 2002)). Of the individual-level adoption literature, only three studies appear to have addressed the adoption of internally generated innovations by boundary spanning members (Anderson & Robertson, 1995; Atuahene-Gima, 1997; Hultink & Atuahene-Gima, 2000). The contributions and limitations of these studies in their understanding of adoption can be examined by three criteria of increasing depth of analysis. The studies differ in the degree to which they conceptually separate, firstly, individual from contextual influences, secondly, attitudinal from behavioural components, and, thirdly, cognitive from affective dimensions within their understanding of adoption.

These criteria are conditional upon each other; that is, meeting the first two is a prerequisite for addressing the third. It is important to note this because the third criterion (differentiating cognitive from affective dimensions) has been proposed as particularly relevant to further extend the current understanding of the resistance or acceptance of innovative change (Piderit, 2000) and the boundary spanners' motivation and job performance (Miao & Evans, 2007).

Anderson and Robertson's study on the antecedents of multiline salespersons' adoption of innovative house brands is weak on each of the three criteria due to a limited understanding of adoption, which they defined as the "*extent to which a salesperson makes house brands a proportion of his or her total sales*" ((Anderson & Robertson, 1995) p.18). By reducing the concept of adoption to the relative sales outcomes which a member achieves with the innovation, they allow external, contextual factors, such as customer receptivity, to determine the degree of adoption and cannot differentiate attitudes from behaviours, let alone cognitive and affective dimensions. Anderson and Robertson's approach mingles aspects of innovation adoption and diffusion. Innovation diffusion however is not a part of innovation adoption, but rather its consequence. (Gatignon & Robertson, 1985) (Rogers, 1983).

Atuahene-Gima's work contributes a more differentiated understanding of salespersons' adoption as "*the interaction between the degree to which they accept and internalize the goals of a new product (i.e., commitment) and the extent to which they work smart and hard (i.e., effort) to achieve these goals.*" ((Atuahene-Gima, 1997) p.500). Hultink and Atuahene-Gima (Hultink & Atuahene-Gima, 2000) tested this model on the sales force of a high-technology firm in the Netherlands and found a strong association of their adoption concept with an innovation's selling performance. In comparison to Anderson and Robertson's approach, the concept of Hultink and Atuahene-Gima (Atuahene-Gima, 1997; Hultink & Atuahene-Gima, 2000) clearly represents a more differentiated perspective. Firstly, it treats adoption as a purely individual-level concept which excludes external influences, and secondly, it recognizes that adoption comprises an attitudinal (commitment) and a behavioural (effort) component. However, the second criterion is only partially met because Hultink and Atuahene-Gima combine the attitudinal and behavioural components both conceptually and empirically as an interaction. Moreover, their understanding of

commitment mixes elements of cognition, affect, and behavioural intentions. In sum, while Hultink and Atuahene-Gima's model (Atuahene-Gima, 1997; Hultink & Atuahene-Gima, 2000) provides a significant contribution — meeting the first criterion fully and the second, partially — it cannot distinguish between the cognitive and affective aspects of adoption, and their separate effects on behavioural and performance consequences.

This thesis proposes that the identification concept may more adequately capture attitude formation within the adoption concept in comparison to prior attempts, as it meets all three criteria. Firstly, it acknowledges that adoption occurs at the individual level. Secondly, its conceptual domain is clearly separate from behaviours and intentions. Thirdly, the concept of identification enables a clear distinction between cognitive and affective aspects, thereby offering the most differentiated insight into attitude formation within the adoption process. While chapters 3 and 4 develop identification from a cognitive perspective, chapter 5 contributes an understanding of its emotional dimension by developing the concept of members' affective identification with innovations. The affective dimension of identification is only introduced in chapter 5 because prior work suggests that affective identification is a consequence of cognitive identification (Bergami & Bagozzi, 2000; van Dick, Wagner, Stellmacher, & Christ, 2004). The present thesis, hence, provides a novel and more fine-grained perspective of the attitude formation process in innovation adoption and explores what consequences the cognitive and affective facets may have on behaviour and innovation performance. In sum, chapter 5 contains two contributions: One is its being the first study which assesses the consequences of the previously developed concept of member's identification with innovations. The other is its introduction of a novel perspective on boundary spanners' adoption of innovations, which theoretically and empirically differentiates cognitive, affective, and behavioural elements; explores their interrelation; and shows their distinct impact on an innovation's selling performance. The results obtained are clear-cut evidence that this identification-based approach yields novel insights which may not have been uncovered in previous less-differentiated analyses of attitude formation.

Overall, the thesis provides the first study which — grounded on the social identity approach — theoretically links perceptions of the organizational identity with the

adoption of innovations at the individual level, and studies their consequences for behaviour and innovation performance.

1.3. Outline

Figure 1.1 summarizes the structure of the present thesis; this brief introduction constitutes the first chapter. Chapter 2 positions the thesis within the field of organizational psychology. To attain this goal, the most important organizational psychology paradigms are first briefly introduced in their historical contexts, after which the thesis' specific theoretical background — the social identity approach — is discussed and presented in detail.

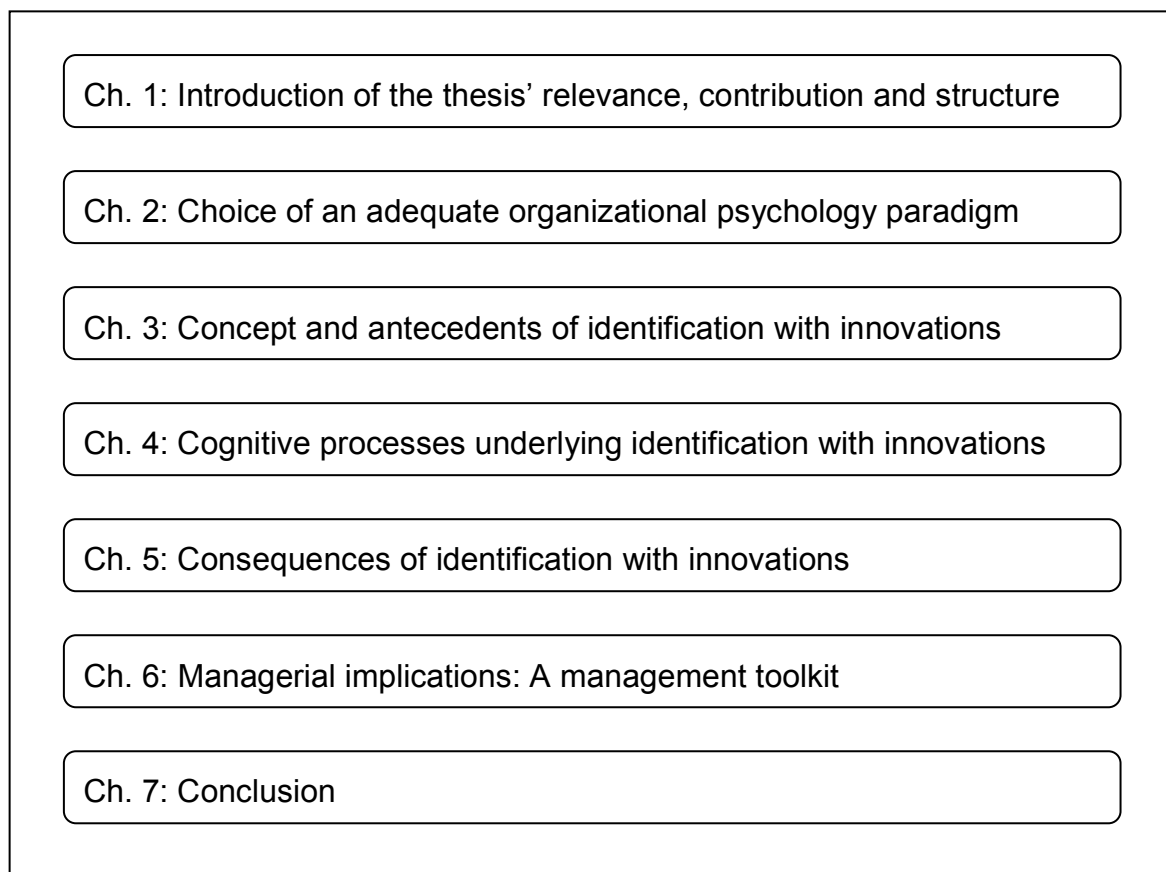


Figure 1.1: Structure of the thesis

From chapter 3 to chapter 5, a series of theoretical models are developed and empirically assessed. While they are tested separately, they all belong to a single overarching framework which is depicted in figure 1.2.

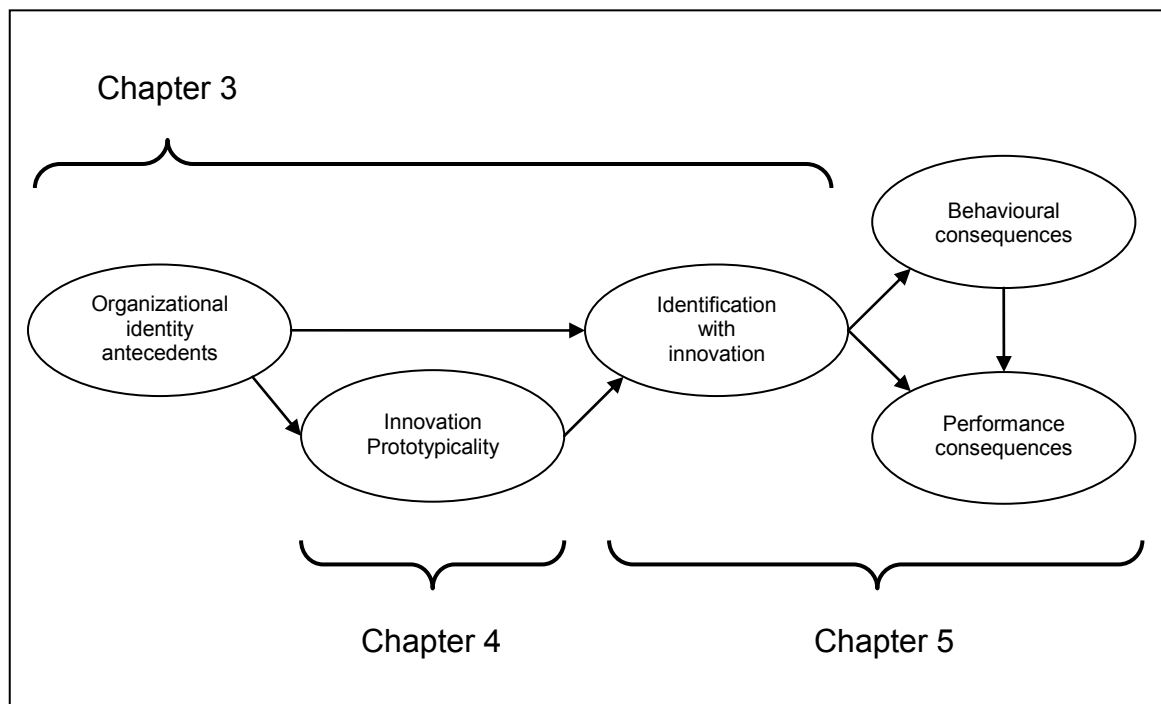


Figure 1.2: Framework of the thesis by chapters

Chapter 3 examines how certain aspects of the organizational identity can influence the extent to which individuals identify with their organization's innovations. The assessment of the direct relationship in chapter 3 is then complemented by the analysis of a key mediating factor in chapter 4. This chapter mainly serves to explain in detail the cognitive underpinnings which link organizational identity perceptions and identification with innovation. Chapter 5 assesses the extent to which the previous findings on perceptual differences are likely to result in 'real' consequences. In other words, it analyzes how innovation-related behaviour and market performance are predicted by differences in the organizational members' identification with the innovation. Chapters 3 through 5 are structured in the same way. They start off with a literature review, which identifies the lack of research and the specific contribution that each chapter intends to make, followed by the development of specific hypotheses, and a presentation of the method by which the hypotheses are tested. All chapters draw on the same dataset. In consequence the sample and the survey instrument used for data collection are described in detail exclusively in the third chapter to avoid redundancy. The method sections of the succeeding chapters exclusively contain issues specific to the respective chapter. After the methods have been explained, the results are presented and assessed as to how they lend support

to each hypothesis. Finally, the results and theoretical implications are discussed; limitations of the studies shown; and areas for future research suggested. Managerial implications are derived in chapter 6. Managerial implications are presented after the theoretical framework and its specific hypotheses have been fully developed and tested, because this allows integrating all research insights and developing a toolkit for innovation-identity management (see figure 1.3.).

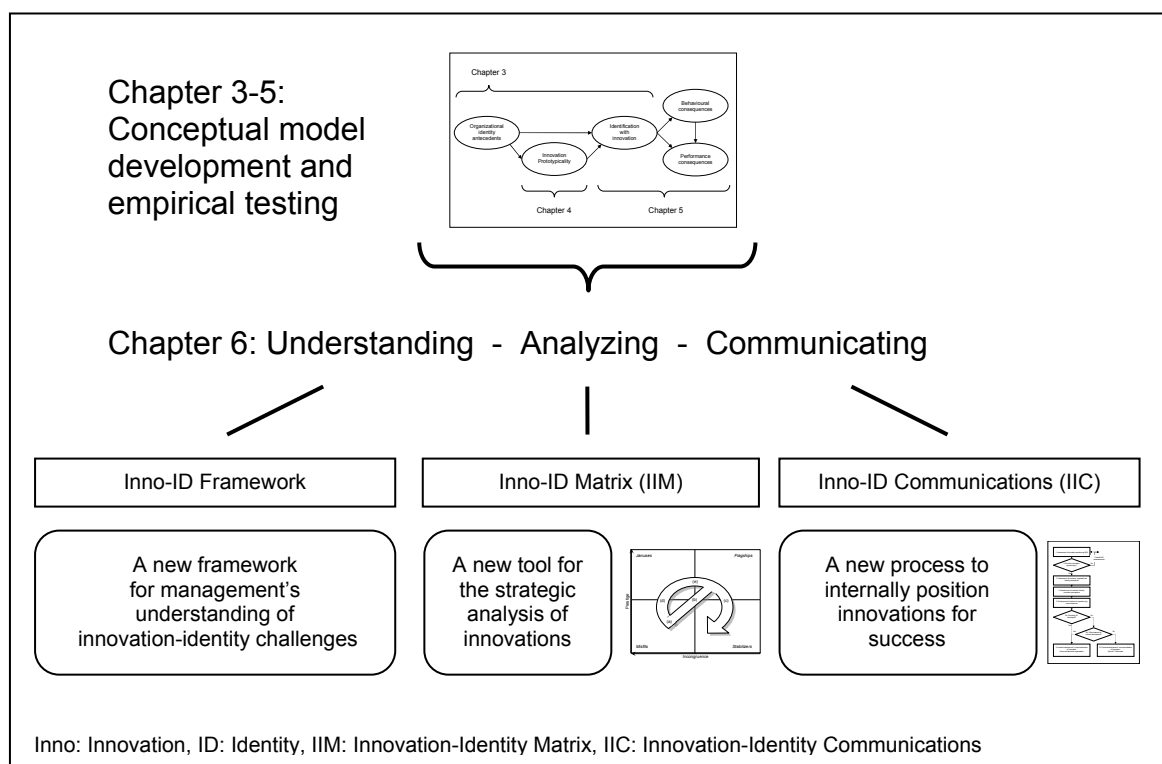


Figure 1.3: Managerial implications: A toolkit for innovation-identity management

Chapter 6 first indicates how the studies' conceptual framework and results allow for an enhanced managerial understanding of innovations. It then shows how this new perspective can be translated into a strategic tool that enables making better-informed managerial decisions. A new innovation-identity portfolio matrix – IIM – is derived. As a case study, the IIM is applied to the innovation portfolio of a leading healthcare organization. Finally, a new process is proposed by which innovations can be internally positioned for success. The new process details how management can develop innovation-identity communications – IIC – that will support the acceptance of innovations by the workforce. A speech by Steve Jobs serves a case study demonstrating the principles and the power of identity-congruent communications. The thesis ends with a brief conclusion.

2. Theoretical Foundations and Background

2.1. Organizational psychology paradigms

Overview

Theories of social psychology in work organizations examine the psychological processes by which individuals contribute to and are affected by organizational life. While the range of social psychological theories explaining human cognition, affect and behaviour within organizations is vast, four major paradigms are influential in organizational theory and practice to this present day. These paradigms have been identified as the economic paradigm, the individual differences paradigm, the human relations paradigm and the cognitive paradigm (Haslam, 2001). Each paradigm will be described briefly in order to show how it contributes to the social identity approach on which the present study is based.

Economic paradigm

At the turn of the 19th century, Frederick Taylor developed a theory of *scientific management* that was essentially motivated by a rejection of human and financial waste (Taylor, 1916 (1996)). He began his studies at Midvale Steele Company, but it is his work at Bethlehem Steel Company and the resulting productivity gains achieved there that became most widely known. Taylor observed two main impediments for the efficient performance of workers: Firstly, he observed that motivational shortcomings of organizational members, such as loafing, were often attributable to a lack of fit between the individuals' profiles (mental/physical) and their respective tasks (Taylor, 1916 (1996)). Secondly, he attributed productivity problems to group dynamics, which he viewed as incentivizing individuals in groups to work less and be reluctant to change. In consequence, he urged to separate workers from their peer groups, to treat them as individuals and to propose personal economic benefits in order to stir their ambition and initiative. He advocated systematic processes for the selection and incentivization of individual workers as well as in-depth analyses down to even the simplest tasks (Taylor, 1916 (1996)). As his focus was almost completely directed towards raising *individual* task efficiency, based on a very negative view of *social* relations, this early approach can be understood as an exemplar of the undersocialized (Granovetter, 1985) economic paradigm that

dominated psychology of work in the early decades of the 20th century (Haslam, 2001).

Individual differences paradigm

Building on Taylor's scientific management approach, Hugo Muensterberg delved into further understanding individual differences by adopting a more explicitly psychological perspective. Muensterberg's goal was to identify a comprehensive set of psychological attributes by which workers could be systematically differentiated and assigned to specific tasks. Concordant with other researchers of his time, he also sought to detect psychological principles that could be applied to entice workers to more willingly participate in scientific management initiatives. Towards these goals, he developed and applied a set of novel experimental methods that have been identified as the precursors of today's psychological personnel testing (Haslam, 2001). For his achievements, Muensterberg has often been quoted as the founder of industrial psychology (Haslam, 2001). Muensterberg found that two major influences constrained a systematic assessment of individual psychological differences (Muensterberg, 1913). Firstly, he had to concede that the workers' assessments of their work were highly subjective and, as such, often contrary to the expected. Secondly, he observed that group memberships had a strong impact on the individuals' appraisals of their work (Muensterberg, 1913). Instead of further pursuing these psychological effects at the *group* level, though, Muensterberg persisted with his focus on *individual* differences, which he deemed to ultimately be the decisive driver of job performance (Muensterberg, 1913).

Human relations paradigm

The human relations paradigm, which is probably most widely known by the foundational experiments conducted by Elton Mayo at the Hawthorne Plant of the Western Electric Company of Chicago, raised serious doubts about the usefulness of the individualized approach as previously developed within the economic and individual differences paradigm. Mayo and his colleagues segregated groups of workers from the overall workforce and systematically varied their working conditions (lighting, resting periods, etc.) while monitoring the impacts of those changes on the workers' job satisfaction and productivity. Surprisingly, they found that productivity and job satisfaction increased among the segregated groups of workers with every

experimental intervention, irrespective of the specific change in working conditions to which the workers were exposed. This led them to the conclusion that productivity was not mainly driven by the fit of certain working conditions with *individuals'* psychological or physical attributes, but had to be explained by a changing state of *social* relations at the group level. It was not the content of the change that seemed to matter, but the process of change itself (Haslam, 2001). Mayo concluded that the experimental interventions and the attention from senior management which the workers received in the course of the experiments had "*transformed a group of 'solitaires' into a social group*" ((Mayo, 1949) p.58). He inferred that work must be understood as a fundamentally *social* activity within which recognition, security and a sense of belonging to a social entity may prove more important for job satisfaction and productivity than the material conditions under which a worker operates (Mayo, 1933). Importantly, Mayo and his colleagues also recognized that the process of socialization that had taken place exerted pressure on group members to act in solidarity and to conform to group norms, such that not only underperformance but also overperformance was sanctioned by the group (Roethlisberger & Dickson, 1939). Social relations within informal groups could, thus, turn out to both support and limit individual performance. In summary, the most important insight of the human relations paradigm for the present study is its emphasis on the importance of the social dimension for individuals' attitudes and behaviours at work. The unparalleled breadth of the Hawthorne experiments had provided conclusive evidence that the influence of group membership and group interests may well be more important for determining job satisfaction and performance than individual's idiosyncratic differences and self-interests (Mayo, 1949).

Cognitive paradigm

While human relations scholars had uncovered the importance of the social dimension to work and organizational life in general, their approach did not provide explanations for the underlying social psychological processes (Haslam, 2001). With the Second World War, social psychologists' attention shifted from possible links between individual and social psychological phenomena towards researching *group dynamics* at the group level, arguably because intergroup behaviour during wartime appeared unlikely to be rooted in any individualistic notion (Haslam, 2001). During the 1960s, a 'cognitive revolution' took place in the area of psychology. The black-

box approach of behaviourism was discarded and many psychologists' interests shifted towards discovering the mental processes underlying behaviour (e.g., memory, judgement, attention, information processing and perception) (Haslam, 2001). Under their influence, a *social cognition* approach (Fiske & Taylor, 1984) emerged in social psychology and it was successfully applied to the study of organizations (for an excellent review, see (Landy, 1989)). The social cognition approach effectively incorporated research on general cognitive principles into the study of organizational behaviour. It thereby contributed to an understanding of individual cognition *within* a social context and how individual-level processes may influence group behaviour. However, the cognitive paradigm did not take into account that the social context itself may actively exert psychological influences on an individual's mental processes (Pfeffer, 1997).

As a synthesis, the above-delineated organizational paradigms can be differentiated and compared along two dimensions (Haslam, 2001) (see figure 2.1). Firstly, the paradigms differ by the degree to which they explicitly acknowledge and assess *psychological processes* of organizational members. Secondly, they can be distinguished by the degree to which they analyse the *social context as an influence* on these individual psychological processes. It is noteworthy that, viewed through this lens, the paradigms have been fluctuating between both dimensions (Haslam, 2001).

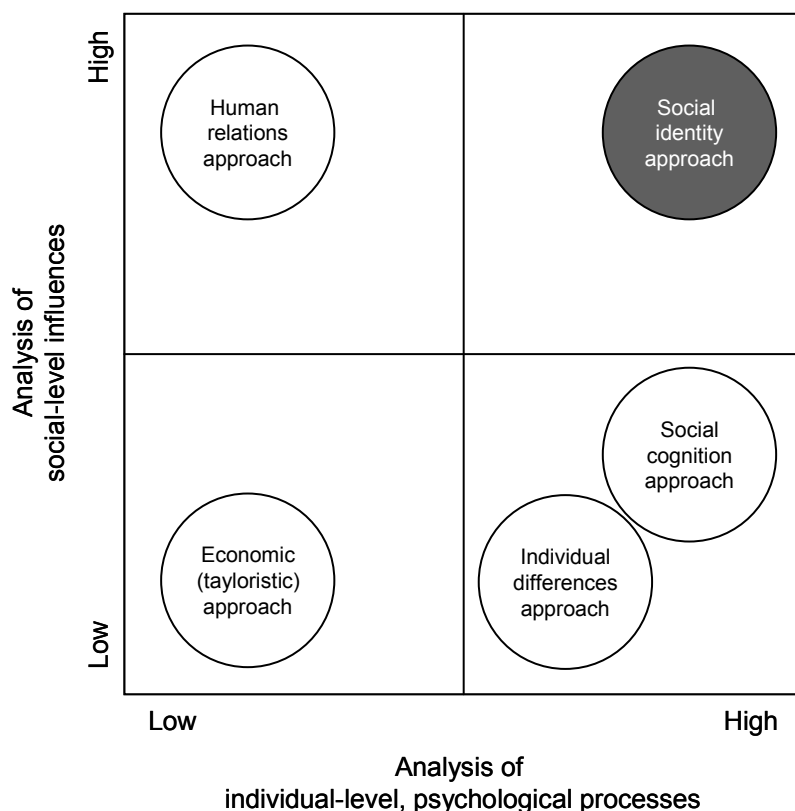


Figure 2.1: Classification of social psychology paradigms
(adapted from (Haslam, 2001) p.23)

As has been described above, the first paradigm that systematically studied work in organizations – the tayloristic *economic* approach – scored low on both dimensions. The next paradigm that emerged – the *individual differences* approach – explicitly focussed on the psychological processes underlying scientific management practices. With the third paradigm – the *human relations* approach – the importance of the social context was discovered, but previously gained insights on individual psychology in work organizations were largely disregarded. The cognitive revolution again shifted the attention and allowed for deeper insights into psychological processes of individuals in organizations. While this *social cognition* approach often refers to organizations as social groups, the direct impact that such collectives could have on individuals – as had been previously exemplified through the Hawthorne experiments – were not incorporated into this theoretical perspective.

Only since the late 1970s has a social psychological approach been developed that combines both aspects, thereby integrating key insights from previous paradigms.

And it is only since the early 1990s that this approach has received increased attention for the study of organizational behaviour. This paradigm – the *social identity* approach – will be laid out in the following chapter. The social identity approach will be chosen as the underlying theoretical basis for the present dissertation, as it fits the study's goal particularly well: To provide a psychology-based explanation of the attitudes and behaviours of individuals in response to innovative actions of a larger collective to which these individuals belong, while explicitly acknowledging that their membership in this social collective may constitute an important part of their life and thus exert influence on their attitudes and behaviours.

2.2. The social identity approach

2.2.1. Historical context and development of the social identity approach

As has been outlined in the previous chapter, the social cognition approach largely adopted an individualistic and thus reductionist approach to social psychology. Research in this paradigm was mainly carried out in North America, while European social psychology grappled with the detrimental impact of the Second World War (Abrams & Hogg, 2004; Hogg et al., 2004). Beginning in the 1960s, though, European social psychologists realized that they had a common perspective, which represented a distinctly wider view of the social dimension than prevailing social psychology (Jaspars, 1980). This more *social* approach to social psychology (Taylor & Brown, 1979) and the interactionist metatheory provided the fertile ground for the development of social identity theory (SIT).

Social identity theory was thus intended as a direct challenge to individualistic, reductionist approaches within social psychology, for example as exemplified by Allport (Allport, 1924). The theory was originally developed in the mid-1970s by Henri Tajfel and his colleagues at Bristol University, most notably among them John Turner, who had joined the group as a graduate student at the beginning of the decade (Hogg et al., 2004). Other researchers involved in the early developments included Mick Billig, Hilde Himmelweit, Rupert Brown, Dominic Abrams and Michael Hogg (Abrams & Hogg, 2004). By the year 1974, most of the theory had been laid out by Henri Tajfel in an unpublished manuscript (Hogg et al., 2004) and was

subsequently formalized, expanded and jointly published by Tajfel and Turner in 1979 (Tajfel & Turner, 1979). As it mainly treated *intergroup* behaviour, it was also later called the “*social identity theory of intergroup behaviour*” ((Turner et al., 1987) p.42).

Then, from the late 1970s to the mid-1980s, Turner and his colleagues elaborated the social-cognitive processes on which social identity is based and formalized them as self-categorization theory (SCT) (Turner, 1982, 1985; Turner et al., 1987; Turner, Oakes, Haslam, & McGarty, 1994). While social identity theory had been largely focussed on explaining phenomena at the *intergroup* level, self-categorization theory represented an expansion towards a more general theory of behaviour that was now also able to cast light on *intragroup* phenomena. Hence, SCT has been more generally called a “*social identity theory of the group*” ((Turner et al., 1987) p.42).

Different opinions have been voiced as to whether both theoretical strands – SIT and SCT – should be treated in an integrated or differentiated fashion. On the one hand, a separation has been argued to prevent misunderstandings that arise when self-categorization theory is “*crudely subsumed within social identity theory*” ((Haslam, 2001) p.43), while on the other hand, proponents of an integrated view suggest that the common core assumptions (metatheoretical background) of both theoretical strands call for such a synthesis and conclude that separation of both theories “*would be a mistake*” ((Abrams & Hogg, 2004) p.100). There is a consensus, though, that both theories may be subsumed as the ‘social identity approach’ or ‘*social identity perspective*’ (Abrams & Hogg, 2004; Haslam, 2001), terms that were first introduced by Hogg and Abrams in their effort to provide a comprehensive overview of the state of the research in the social identity realm (Hogg & Abrams, 1988).

The present study will take both caveats into account. In order to avoid a superficial mix-up of the different theoretical arguments, the following introductory chapters will begin by laying out both theoretical strands separately. In later chapters, then, theoretical development and application will draw on both theories in an integrated way for resolving specific organizational research questions.

2.2.2. Social identity theory – Overview and key definitions

After having traced the historical development of scholarship in social identity, this chapter will leave the chronological structure and present SIT in its current form. It should be noted, though, that the following overview serves as a necessary, general background for the subsequent studies in organizational identity. Thus, it only covers the main outline of the theory, while specific aspects of the theory will be discussed in more detail in subsequent chapters as required by the research question at hand.

Within SIT, a group may be defined as a “...*collection of individuals who perceive themselves to be members of the same social category, share some emotional involvement in this common definition of themselves, and achieve some degree of social consensus about the evaluation of their group and of their membership of it*” ((Tajfel, 1979) p.40). SIT understands social categorizations as cognitive tools serving two purposes (Tajfel, 1979): Firstly, social categorizations order the social environment and thereby enable the individual to act in it. Secondly, they provide an orientation for self-reference, thereby creating and defining an individual’s position in the social world. Thus, “*social groups provide their members with an identification of themselves in social terms*” ((Tajfel, 1979) p.40).

Social identity then, “*consists of those aspects of an individual’s self-image that derive from the social categories to which he perceives himself as belonging*” (Tajfel, 1979) p.40). It must be differentiated from the other part of an individual’s identity, personal identity, which refers to self-knowledge stemming from unique personal attributes such as physical appearance, intellectual qualities or idiosyncratic tastes (Turner, 1982).

Three fundamental principles of SIT can be deduced from the general assumptions underlying SIT regarding the self-concept, social categorizations and social comparisons (Tajfel & Turner, 1979):

First, individuals are assumed to pursue a positive self-concept, to seek for maintenance or enhancement of their self-esteem. SIT deduces that individuals will strive to achieve a sense of positive social identity.

Second, social categories are assumed to carry positive or negative value connotations. Hence, positive social identity can be derived from membership in a category (ingroup) when it is perceived as positively distinct in comparison to some relevant outgroup.

Third, if the comparative evaluation of one's ingroup and the resulting social identity is unsatisfactory, individuals will either join a more positively distinct group (social mobility) or attempt to make their ingroup more positively distinct (social change/creativity).

Having laid out the main definitions and principles of social identity theory, the remainder of the chapter examines the theoretical reasoning of SIT in further detail and portrays the fundamental, initial empirical findings which evidence its relevance.

Tajfel and his colleagues developed SIT as a truly social psychology-based understanding of intergroup conflict, prejudice and discrimination (Haslam, 2001). Their explicit goal was to counter the prevalent explanation of intergroup conflicts, which was based on competition for resources (Sherif, 1966), and to do so without recurring to personality or other individualistic perspectives (Billig, 1976; Turner, 1996).

Towards that goal, Tajfel and his colleagues performed experiments that have come to be known as the 'minimal group studies'. These experiments aimed at limiting perceived group membership to a minimal cognitive categorization (Tajfel, Billig, Bundy, & Flament, 1971). Members were randomly assigned to their groups and were told their assignment to the group was based on a single, largely meaningless differentiating criterion (e.g., preference for Klee versus Kandinsky paintings) (Haslam, 2001). This experimental setup effectively excluded traditional explanations of intergroup relations such as histories of conflict, personal animosity or interdependence (Haslam, 2001).

Participants were then asked to assign points (representing a certain amount of money) to two anonymous individuals: one being a member of their ingroup and the

other being a member of the outgroup. Counter-intuitively, participants neither attempted to maximize the *absolute profit* for their ingroup member, nor follow a strategy of fairness that would have aimed to achieve the *same profit* for both, nor one that would have maximized the *joint profit*. Instead, participants consistently aimed at maximizing the *relative difference* between their own and the other group's profit, even if it meant that their ingroup member would end up with a lower profit in absolute terms than alternative strategies would have offered (Tajfel et al., 1971). Apparently, it was not of highest importance that the own group did well for itself, but rather that it did better than the other group. Subsequent studies replicated the findings in different contexts (Billig & Tajfel, 1973; Brown, 1978). In summary, the minimal group studies provided conclusive evidence that individuals' favouritism towards a certain group is induced as soon as they categorize themselves cognitively with that group.

Social identity theory explains these and similar findings by recurring to individuals' needs for self-esteem: *"In essence it suggests that after being categorized in terms of a group membership, and having defined themselves in terms of that social categorization, individuals seek to achieve positive self-esteem by positively differentiating their ingroup from a comparison outgroup on some valued dimension. This quest for positive distinctiveness means that when people's sense of who they are is defined in terms of 'we' rather than 'I', they want to see 'us' different to, and better than, 'them' in order to feel good about who and what they are"* ((Haslam, 2001) p.32).

Two aspects of SIT's group biases are frequently neglected (Haslam, 2001). Firstly, ingroup favouritism should neither be conceived of as a universal cognitive bias nor as a personal disposition towards prejudice (Turner & Oakes, 1997; Turner & Reynolds, 2001). SIT clearly states that the bias mechanisms are depend on the social context and other contingent factors, which will be further examined below. Secondly, SIT predicts that ingroup favouritism will not be observed when social comparisons occur on dimensions that are not relevant to self-esteem or that cannot be contested. In such instances, outgroup favouritism can occur (Terry & Callan, 1998).

SIT proposes a series of factors upon which the occurrence of ingroup favouritism and other social identity effects are contingent.

First, not all groups to which an individual belongs are necessarily of the same importance to his self-esteem. The degree to which an individual has internalized his group membership as a part of his self-concept is called social *identification* (Hogg & Abrams, 1988; Tajfel, 1979). The higher an individual's identification with a certain group, the more probable the emergence of social identity effects such as favouritism towards members of this group (Tajfel, 1979; van Knippenberg, 2003). For example, an individual's membership of a certain gas station rewards club (e.g., Shell Clubsmart) will typically be less relevant to his self-concept than his membership of a certain company as an employee. This given, ingroup favouritism behaviour may be expected towards members of the same company, but probably not towards members of the same rewards club.

Second, SIT emphasizes that social identity effects are dependent on the social context (Tajfel, 1979). Individuals will tend to think in terms of their group memberships when the social context defines them along group-based lines. SIT argues that in such circumstances, the *salience* (Bruner, 1957) of their social identity is relatively high. Salience refers to the degree to which a social identity is activated in a certain situation (Oakes, 1987). Heightened social identity salience induces group members to perceive their relations with outgroup members from an *intergroup* rather than from an *interpersonal* perspective. Accordingly, SIT predicts that in instances of high social identity salience, homogeneous perceptions and uniform treatments of outgroup members can be expected (Haslam, 2001). For instance, an industry trade fair (e.g., CeBIT) represents a social context in which employees of an IT company are more conscious of their company membership than, say, within the context of a classical concert. In consequence, individuals will tend to view and treat each other as members of certain companies when meeting at trade fairs and as individuals when meeting at a classical concert.

Third, the *relevance* of the comparison group has been shown to play a role in the emergence of social identity effects. The presence of competing outgroups which threaten the status of the ingroup tend to accentuate intergroup biases, while the

presence of cooperative groups typically attenuate them (Tajfel, 1979). Returning again to the trade fair example, the salience of individuals' social identity as members of a certain company will be further raised when standing at, or passing by a competing company's booth.

Fourth, SIT proposes social *belief structures* (Tajfel, 1974, 1975) as contingencies which may actually be of special importance in organizational contexts (van Knippenberg, 2003). *Social mobility* beliefs can be described as the conviction that individuals are free to move between groups in order to enhance their social status (Tajfel, 1974, 1975). *Social change* beliefs are characterized by the opposite view, namely that self-advancement may only be achievable by remaining a group member and changing it from within (Tajfel, 1974, 1975). According to SIT, the more an individual adopts social change beliefs, the more his perception and behaviour will be guided by social identity (Haslam, 2001). Social change beliefs can, on the one hand, be caused by contextual factors such as the perception of impermeable group boundaries or a degree of intergroup conflict, which prohibits mobility. On the other hand, social change beliefs may also be triggered by more personal aspects such as a desire to clarify group boundaries or to raise the impact of group membership (Tajfel, 1974, 1975).

Having elaborated the main lines of social identity theory as developed by Tajfel and his colleagues, the next section will focus on self-categorization theory, which explains in further detail the cognitive processes underlying the social identity approach.

2.2.3. Self-categorization theory – Overview and key definitions

In essence, Self-categorization theory (SCT) is predicated on five major theoretical building blocks (Turner, 1985; Turner et al., 1987).

First, as is apparent from the theory's name, SCT builds on a process of cognitive *self-categorization*. SCT argues that when an individual defines himself as a member of a certain group, he perceives himself as belonging to a category of cognitive stimuli. A stimulus is here broadly defined as "*an agent, an action, or a condition that*

elicits or accelerates a physiological or psychological activity or response" ((American Heritage Dictionary, 1992) p.1766)). Following the cognitive psychological perspective (Neisser, 1967), elements of a category will be referred to as 'stimuli' in this study when the interest is in the cognitive response that an element provokes in the perceiver rather than the element's substance or dedicated function. In other words, the mere fact that an individual categorizes himself with a certain set of stimuli implies that he perceives himself as relatively similar to them, while relatively distinct from stimuli in other categories.

Second, categories can be formed at different levels of abstraction (Haslam, 2001). Three fundamental levels can be distinguished at which self-categorization occurs. They are, ordered in an increasingly inclusive degree of abstraction: the *personal* level at which self is regarded as an individual; the *social* level at which self is perceived as a member of a social group; and the *human* level at which self is perceived as belonging to the category of human beings (Haslam, 2001). It is important to notice that while each categorization level may be principally legitimate to describe an individual's 'true' self, each level may not be equally salient at all times. When an individual categorizes himself at the social level, his social identity is salient. SCT further suggests that salience of a certain category level reduces the salience of other categories at higher and lower levels of abstraction. This principle is known as *functional antagonism* in SCT (Turner, 1985). In organizations, the social level generally includes several hierarchical layers of social groups. Such layers may typically include the team, the department, the business unit or the organization as a whole. For instance, when an employee categorizes himself as a member of his business unit, he will be — at that moment — less aware of himself as a member of the whole organization or of a specific project team.

Third, how perceivers categorize a set of stimuli is in part dependent on the principle of *meta-contrast* (Alpern, 1953; Hamilton & Sherman, 1996). This principle suggests that any collection of stimuli will be perceived as forming a category when differences among these stimuli appear lower than differences between them and other surrounding stimuli. Stimuli are thus categorized in a way that maximizes within-category similarities and between-category differences of stimuli. It follows that an

identical collection of stimuli may be categorized differently, depending on which stimuli surround them in the social context.

Fourth, SCT is built on a general principle of cognitive psychology, namely that all categories have an internally graded structure; features of a category can be ranked by the degree to which they represent the category (Rosch, 1973). More representative features of a category are said to have a higher degree of category *prototypicality* (Rosch, 1978). Prototypicality can be defined as the degree to which an element of a category fits the idea or image of the meaning of the category name (Rosch & Mervis, 1975). For instance, within the cognitive category of 'vehicles', an automobile is generally perceived as very prototypical, a scooter as moderately prototypical and an elevator as relatively atypical for the category (Rosch, 1975). Taking the category of 'sports' as another example, football, horse racing and cards are generally ranked with decreasing prototypicality (Rosch, 1975). Likewise, features of an organization such as certain attributes, behaviours or individuals can be seen to represent it better than others. For instance, Jack Welch or Steve Jobs would arguably be seen by many as highly prototypical members of their organizations. SCT suggests that the degree of prototypicality is driven by the principle of meta-contrast, when applied to the intra-categorical domain: A particular member or attribute will be perceived as having a higher prototypicality for the category to the extent that it is more similar to its category members than to other surrounding social stimuli.

Fifth and last, salience of a certain categorization reinforces and accentuates the perception of within-category similarities and between-category differences on category-relevant dimensions of comparison. Due to such cognitive categorization, perceptions are induced that category members are more similar to their category members and more different from members of other categories. This effect of viewing oneself and other individuals through the lens of a category instead of personal differences is known in SCT as *depersonalization* (Brewer, Manzi, & Shaw, 1993; Hogg & Terry, 2000).

The above five building blocks of SCT show how social categories are cognitively formed, at what levels they can exist, how certain category features can be more prototypical than others and how categorizations tend to reinforce themselves.

Before concluding, the determinants of social identity salience shall briefly be discussed, as SCT stresses the overarching influence that social identity salience exerts on perception and self-definition. Penelope Oakes developed a framework based on the notions of accessibility and fit to explain under which conditions and due to which drivers certain social identities will be activated (Oakes, 1987).

Accessibility or perceiver readiness (Bruner, 1957) represents the first determinant of social identity salience. It can be differentiated into two different aspects. *Chronically accessible* categories represent social categorizations in memory that are readily available because they are valued, important and frequently used aspects of the self-concept (Hogg et al., 2004). In contrast, *situationally accessible* categories only emerge when they are self-evident and perceptually activated due to the immediate situation (Hogg et al., 2004)

The second determinant of social identity salience, *fit*, can be defined as “*the degree to which a social categorization matches subjectively relevant features of reality so that the category appears to be a sensible way of organizing and making sense of social stimuli (i.e. people and things associated with them)*” ((Haslam, 2001) p.50). Two different facets of fit can be distinguished, which both are based on the principle of meta-contrast described above:

Comparative or structural fit (Hogg et al., 2004) describes the extent to which an accessible category is able to account for similarities and differences among individuals or other salient stimuli. Put differently, comparative fit is achieved when there are smaller intracategorical differences of social stimuli than intercategorical differences. *Normative* fit, however, goes beyond comparative fit in addressing whether category and stimuli are congruent in normative content (Haslam, 2001). When normative fit cannot be reached, the social category will not be salient; individuals will rather draw on alternative accessible categorizations to make sense of the present social stimuli (Hogg et al., 2004).

2.3. Conclusion: The adequacy of the social identity approach for the study of innovations

As laid out in the introduction, the present thesis is interested in understanding at the individual level how organizational members come to adopt innovations and promote them towards market success, while taking into account that organizational-level characteristics clearly have a considerable influence on members' cognitions, affects and behaviours towards innovations. Hence, only an organizational psychology paradigm that integrates both individual-level psychological processes as well as social context influences is suitable for comprehensively addressing innovation adoption.

The economic paradigm does not offer either aspect. Neither the individual differences paradigm, the cognitive paradigm nor the human relations paradigm allow for a combined perspective, as the first two approaches focus almost exclusively on individual-level psychology, while the last limits itself to social influences. In conclusion, the social identity approach represents the most suitable theoretical basis in organizational psychology, as it is capable of explaining psychological processes at the individual level as well as integrating influences from the social context.

The present thesis is, therefore, rooted in the social identity approach. From this perspective, an 'organization' is here defined as a cognitive category that serves its members to effectively classify subjectively relevant aspects of their daily work reality and to make sense of stimuli such as people, processes or innovations surrounding them inside or outside the organizational boundaries. Such an organizational category is composed of various features and can be characterized in many ways. Not all features of this organizational category are alike. Rather, the features vary as to how essential and representative they are for the organization. Features that its members recognize as being core, distinctive and enduring features of the organizational category have been referred to as composing the organization's identity (Albert & Whetten, 1985).

Over the past two decades, the application of the organizational identity concept has proven fruitful in explaining a broad range of intraorganizational phenomena,

including how organizations and their members interpret issues (Dutton & Dukerich, 1991), respond to identity ambiguity (Corley & Gioia, 2004) and threats (Elsbach & Kramer, 1996; Ravasi & Schultz, 2006), solve top-management conflicts (Golden-Biddle & Rao, 1997), manage cognitive maps (Fiol & Huff, 1992), develop competitive advantage (Fiol, 1991, 2001) or manage stakeholder relationships (Scott & Lane, 2000).

The following chapters extend the research on organizational identity by showing how this concept can contribute to our understanding of innovation management. More specifically, the subsequent chapters theoretically develop and empirically evidence how members' perceptions about their organization's identity influence the success of innovations, from individual-level adoption within the organization to their successful launch and performance in the marketplace.

3. Identifying with Innovations: A New Perspective on Attitude Formation towards Innovative Change

3.1. Introduction

Organizational identity comparisons and change

Research in organizational identity recognized early on the concept's potential for explaining change processes in organizations, e.g. (Dutton & Dukerich, 1991; Gioia & Thomas, 1996; Gioia et al., 1994; Reger et al., 1994). Extant research has largely focussed on the aspect that organizational identity may act as a *constraint* to change and how related resistance may be overcome (Ashforth & Mael, 1998; Brown & Starkey, 2000; Dutton & Dukerich, 1991; Elsbach & Kramer, 1996; Fiol, 2002; Fiol & O'Connor, 2002; Nag et al., 2007; Pratt & Foreman, 2000). The perspective that organizational identity may also function as an *enabler* of change seems to have received considerably less attention. This may be attributable to the fact that organizational identity has been often conceived as an enduring feature of organizations, which may, if at all, only change gradually and slowly (Albert & Whetten, 1985; Dutton & Dukerich, 1991) in order to maintain collective self-esteem and continuity (Brown & Starkey, 2000). It may also be owed to the circumstance that studies in this line of research have primarily focussed on *current* features of organizational identity, which answer the question: "*Who are we as an organization?*" ((Gioia & Thomas, 1996) p.379). Indeed, when organizational members take the *current* organizational identity as a prominent guiding light, it may well induce a reinforcement of the status quo and act as a constraint to change (Gioia & Thomas, 1996).

A study by Gioia and Thomas represents one of the few exceptions that go beyond assessing the inertial effects of the currently perceived organizational identity (Gioia & Thomas, 1996). It explicitly considers the effects of desired future states of the organizational identity, that is, how members answer the question: "*Who do we want to be as an organization?*" ((Gioia & Thomas, 1996) p.379). Gioia and Thomas found that evoking the desired future image of an organization ('becoming a top-10 public research university') guided top management towards interpreting issues in a

strategic way. An emphasis on the present image, however, led to issue interpretations that focussed on the status quo. They concluded that desired future images foster a strategic focus that, when acted upon, drives organizational change. Thus, while a focus on current organizational identity may induce inertia, an emphasis on future images of the organization may fuel change efforts (Gioia et al., 2000; Gioia & Thomas, 1996). Another work that explicitly considers desired future states of organizational identity is a conceptual study of Reger and her colleagues (Reger et al., 1994), which introduced the concept of an 'identity gap'. They define the identity gap as the cognitive distance that members perceive between the current and the ideal organizational identity. Reger and her colleagues argued that the identity gap represents a self-discrepancy which causes stress and motivates change. More precisely, the identity gap is conducive to change when its perceived size falls within an optimal range, which they labelled the 'change acceptance zone' (Reger et al., 1994). The size of the perceived gap should be neither too small, because change would then be perceived as unnecessary, nor too large, because in such instances change would appear unattainable. Building on this research, Foreman and Whetten more recently developed a generalized framework that integrates how organizational members compare their identity perceptions (e.g., current organizational identity) with their identity expectations (e.g., ideal organizational identity) and argue that such comparisons are key drivers of members' attitudes and behaviours (Foreman & Whetten, 2002). If organizational identity comparisons indeed exert a strong influence on its members' perceptions and behaviours, it is surprising that only these few works appear to have explored how such organizational identity comparisons may support or inhibit organizational change.

The above-mentioned studies represent key contributions but also leave central questions unanswered. Gioia and Thomas' work (Gioia & Thomas, 1996) is seminal in showing that, firstly, current organizational identity perceptions may be malleable through change initiatives and, secondly, desired future images may serve as useful interpretive lenses that facilitate change. However, they do not explain why certain future images and their related change initiatives appeal to organizational members while others are considered undesirable and fiercely resisted. It remains unsolved, then, how a future image of the organization and related change initiatives (on the

path to this image) can be made acceptable or even desirable for organizational members. The work by Reger and her colleagues (Reger et al., 1994) contributes an initial identity-related explanation as to why change initiatives may be resisted. Their mostly conceptual study on total quality management (TQM) implementation is built on personal construct theory (PCT) (Kelly, 1955), which proposes that individuals use bipolar cognitive constructs to structure and interpret information. For instance, 'low-cost vs. differentiation' represents a bipolar construct, which is frequently used in the strategy realm. PCT suggests that such constructs act like channels that guide cognition in limited, mutually exclusive directions. The poles of a construct are said to carry opposite value connotations: one pole being more attractive than the other. Reger and her colleagues argue that the bipolar nature of constructs may cause resistance to change initiatives as it leads to a) failure to comprehend the new initiatives, or b) cognitive opposition towards them (Reger et al., 1994). Failure to comprehend may arise from a lack of cognitive links between the change initiative's constructs and the organization's core identity constructs, for instance when it is not clear how key elements of a TQM initiative can be applied within a medical clinic. Cognitive opposition emerges when the change initiative's constructs are seen to be in opposition with the positive pole of the organizational identity construct, for instance when a TQM initiative is viewed as threatening a company's valued 'differentiation' identity (Reger et al., 1994). In order to overcome resistance, Reger and her colleagues suggest to increase the organizational members' stress by manipulating either the ideal organizational identity ('who we want to be') or the perceptions of the current identity through external feedback. They propose that a moderate widening of the identity gap will create pressure in the minds of organizational members and lead to acceptance of the change. While their study provides a cognitive, identity-based explanation as to why resistance can arise, three key issues remain unsolved. Firstly, their concept does not solve the question of how a future organizational image and related change initiatives can be made desirable to the organization's members. Secondly, they do not explain why and how higher stress levels should lead to acceptance of a change that was previously resisted. Thirdly, they do not seem to have considered that – arguably quite often – a change initiative may be resisted for the very reason that it is perceived to change the current organization for the worse and, thereby, to widen the identity gap. In such instances,

a further widening of the gap as recommended by Reger et al. (Reger et al., 1994) will not lead to acceptance, but to even stronger resistance.

In conclusion, most research to date seems to have implicitly or explicitly considered organizational identity as a constraint to change. Only scant research has developed the possibility that organizational identity may be supportive for organizational change. These works have provided interesting initial insights that current and ideal organizational identity perceptions may influence whether change initiatives are accepted or resisted. Clearly lacking is firstly, an understanding of the determinants that make a certain organizational identity and its related change initiatives desirable at the individual member level and, secondly, an understanding of the psychological process how individual members then come to cognitively adopt and truly identify with such change initiatives. This knowledge is critical, however, for devising change initiatives in such a way that they are broadly accepted and promoted by the organization's members.

The social identity approach as an organizational psychology paradigm represents a unique fit for the theoretical question at hand, as it permits to account for both individual-level and organizational-level influences (see chapter 2.1.). It is capable of integrating the individual-level process of identifying with change initiatives as well as the organizational-level influences that organizational identity comparisons may exert on members' adoption decisions. Commensurate with the social identity approach, this present work views organizational identity *per se* neither as a constraint nor as an enabler of change, but rather as a cognitive category or a scheme that guides interpretation of organizational actions (Dutton & Dukerich, 1991). More specifically, the following chapter views innovations as exemplars of organizational change (Anderson, De Dreu, & Nijstad, 2004) and proposes that innovations will be favourably approached by organizational members when they perceive that innovations are moving the current organizational identity closer to the ideal identity. Likewise, innovations will be resisted when members perceive that they are moving the current organizational identity away from the ideal so that the identity gap is widened. In sum, this study suggests that members will be guided in their interpretation of a proposed innovation by its impact on the current organizational

identity as reflected in the question: 'Who are we *becoming* as an organization due to the change?' (Ashforth, 1998; Gioia et al., 2000).

In conclusion, this work represents the first study that examines how innovations are interrelated with members' perceptions and expectations of their organization's identity and how these comparative processes influence whether members will cognitively adopt or resist a certain innovation. More specifically, while extant research has mostly understood organizational identities as quite *rigid* schemes that tend to act as *constraints* to change, this study considers how innovations may be capable of *modifying* current identity perceptions and how expectations of the ideal organizational identity may act as *enablers* of innovative change. Furthermore, uncovering the interrelationship between organizational identities, innovations and the members' self-concept allows developing a social psychological understanding of members' identification with innovations and its determinants. In sum, by grounding its conceptualizations in the social identity approach, this study contributes the first identity-based framework for understanding and managing the desirability of innovations and, in consequence, organizational members' identification with innovations.

3.2. Hypotheses: Identification with innovations – the concept and its drivers

3.2.1. Organizational identities, innovations and identification

In order to link organizational identity perceptions with innovative organizational change and the members' self-concept, definitions of current and ideal organizational identity as well as innovations first need to be derived in consistency with the social identity approach (Tajfel, 1979; Tajfel & Turner, 1985; Turner et al., 1987). Prior organizational identity research has developed a useful definition of perceived *current* organizational identity as the beliefs about the currently existing character of an organization as understood by each of its members (Dukerich et al., 2002; Gioia & Thomas, 1996). However, *ideal* organizational identity has previously been only vaguely defined as future-oriented beliefs about what is desirable (Gioia & Thomas, 1996; Reger et al., 1994). For a more theoretically consistent conceptualization, ideal organizational identity is here equated to the most attractive organizational identity a

member can conceive among all possible alternatives. Prior organizational research in the social identity tradition has shown that the perceived attractiveness of an organization's identity depends on the extent to which it satisfies the members' self-definitional needs (Dukerich et al., 2002; Dutton et al., 1994). In keeping with current social psychological research, self-definitional needs will be subsequently referred to as 'identity motives' (Stets & Burke, 2000; Vignoles et al., 2006). Identity motives can be defined as "*pressures toward certain identity states and away from others, which guide the processes of identity construction*" ((Vignoles et al., 2006) p.309). Individuals strive to construct and maintain a positive identity (Gecas, 1982; Gecas & Burke, 1995; Rosenberg, Schoenbach, Schooler, & Rosenberg, 1995) and identity motives represent the motivators that drive and enable individuals to arrive at a positive view of themselves (Vignoles et al., 2006). Important identity motives include, for instance, self-continuity, self-distinctiveness and self-enhancement (for reviews, see (Stets & Burke, 2000; Vignoles et al., 2006)). They will be discussed in further detail in the next chapter. An organization's identity and its attributes can meet such motives and thereby support individuals in constructing their social identity as organizational members in a positive way. The more a member perceives an organization's identity to meet and fulfil his social identity motives, the more attractive the organization will appear to him (Dukerich et al., 2002; Dutton et al., 1994). If the ideal organizational identity has previously been defined as the most attractive, it can now be redefined in social identity terms as that organizational identity that a member envisions to best meet his social identity motives.

Having developed the concept of current and organizational identity, a definition of *innovations* is needed that is commensurate with the social identity approach. Innovations are here viewed as exemplars of organizational change, following Anderson and his colleagues, who assert that an "*innovation is by definition a form of social restructuring*" ((Anderson et al., 2004) p.152). Specifically, this study adopts one of the most widely accepted definitions of an innovation as "*the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, the organization or wider society*" ((West & Farr, 1990) p.9). This definition contains three criteria by which organizational actions can be classified as innovations. Firstly, they need to be readily *applicable*. This aspect

differentiates innovations from related notions of creativity or inventions. Secondly, only organizational actions that turn out to be *of benefit* at individual or collective levels may qualify as innovations. Thirdly, and most importantly to the present study, organizational actions must be of *relative novelty* to the organization in order to be classifiable as innovations (Anderson et al., 2004; West & Farr, 1990). This last criterion clearly indicates that the degree of innovativeness of an organizational action is not independent of its organizational context. Rather, an organizational action will only be recognized as an innovation when it adds a characteristic to the organization that was previously not seen by its members. Thus, how members interpret organizational actions depends on their (prior) perception of the organization's characteristics. If innovations and organizational characteristics are so intricately related, it is surprising that the arguably most central characteristic of an organization – its identity – has received so little attention in innovation research. Research on the core of the innovation process seems to have hardly paid any attention to the explanatory power of the social identity approach yet, except perhaps for initial conceptual considerations (King, 2003).

However, it should be noted that an adjacent research domain – creativity research – has recently started to recognize the explanatory potential of the social identity approach. Although creativity is not of direct relevance to the present study, the creativity domain is sometimes understood as the 'idea generation' phase (Amabile, 1996), which precedes the core innovation process, that is, the 'idea implementation' phase (Amabile, 1996). Due to the proximity of creativity research, recent findings evidencing the fruitfulness of the social identity approach will be briefly mentioned. In a first study, Adarves-Yorno found that social identity exerted a bias on perceptions of creativity. Participants considered the same ideas to be more creative when they originated from a member of their own group than when the source was an outgroup member (Adarves-Yorno, 2005). In a subsequent study, Adarves-Yorno and her colleagues found that creativity perceptions were not only influenced by group membership, but also by group characteristics. Participants considered non-novel proposals to be more creative than novel proposals when their social identity as members of a conservative group was salient (Adarves-Yorno, Postmes, & Haslam, 2006). Finally, they also found that not only the perception but also the creative behaviour of group members followed group norms when social identity was salient

(Adarves-Yorno, Postmes, & Haslam, 2007). A central conclusion from this research is that creativity is not only determined by the intrinsic attributes of the creation (e.g., its novelty), but also by the social context within which the creation takes place (Adarves-Yorno et al., 2006, 2007). Although these findings about creative acts in experimental groups cannot simply be transferred to organizational innovations, they are fully commensurate with this study's notion that the perception and interpretation of innovations is strongly influenced by the organizational context within which the innovations are originated.

Finally, a conceptualization of organizational member's *identification with innovations* is needed that is consistent with the social identity approach, as prior research on organizational change has mostly limited itself to very general descriptions of member attitudes such as 'favouring' or 'resisting' when defining the acceptance or rejection of innovative change by organizational members (for a recent review, see also (Piderit, 2000)). Likewise, Nigel King (King, 2003) asserts in his recent review of the innovation literature on member involvement: "*The problem is that most of this literature has either treated organizational member involvement as a black box (between the 'inputs' of structure, leadership, resources etc. and the 'output' of innovation), or has reduced its complexities to the single issue of 'resistance'*" ((King, 2003) p.620). The social identity approach allows for a more grounded understanding of members' cognitive adoption or rejection of innovations. Setting out, it should be noted, however, that the social identity approach was developed with a primary interest in social elements such as individuals and groups. It is thus not obvious how material artefacts, such as product innovations, can be integrated with the social identity perspective. The application of the social identity approach to the organizational realm has hitherto viewed the organization as a social group and focussed on how individuals come to identify with it by including this group into their sense of self (Haslam, Powell, & Turner, 2000). Organizational identification has been defined in various ways (for reviews, see (Pratt, 1998; Whetten, 2007)), with one of the earliest and widely used definitions of organizational identification being "*the degree to which a member defines himself or herself by the same attributes that he or she believes define the organization*" ((Dutton et al., 1994) p.239). While the organization serves as identification target in this definition, individuals may also have a sense of congruence or oneness with identification targets other than

organizations. Indeed, it has long been suggested that the theoretical foundations underlying organizational identification may just as well be applicable to other targets of identification, including objects (Pratt, 1998). In other words, *“it is not clear that identifying with individuals is any different, in theory, than identifying with things that are not individuals”* ((Pratt, 1998) p.172). The reason that identification principles may not only be applicable to social elements but also to material artefacts is simply that identification does not occur with the substance or ‘objective’ features of the identification target, but really with the beliefs or image one holds of it (Pratt, 1998). Thus, any image an individual creates and holds of social or material elements can serve as a target of identification. Innovations are here proposed to trigger sensemaking processes (Daft & Weick, 1984; Weick, Sutcliffe, & Obstfeld, 2005) among organizational members by which meaning is attributed to the innovations and images of innovations are created. These images can then serve as targets of identification for organizational members. In other words, the extent to which an organizational member identifies with an innovation can be described as the degree of perceived congruence between the image he holds of the innovation and his social identity as an organizational member (‘Does this innovation represent who I am and what I stand for as a member of this organization?’). In conclusion, identification with innovations is here defined as the degree to which an individual defines himself by the same attributes that he believes define the innovation.

This grounded conceptualization now allows for establishing a causal link between innovations, perceived current and ideal organizational identities and, ultimately, the self-concept of organizational members.

First, this study proposes that perceptions of the *current* organizational identity are malleable by innovations (see figure 3.1.). When the current organizational identity is viewed to be modified by innovations, it is perceived to either approach or move away from the ideal organizational identity, resulting in a reduced or enlarged identity gap. For instance in the case of ‘Innovation A’, the perceived identity gap is reduced. A reduced identity gap means that a member perceives the organizational identity (post-innovation) to better meet his social identity motives than before (pre-innovation).

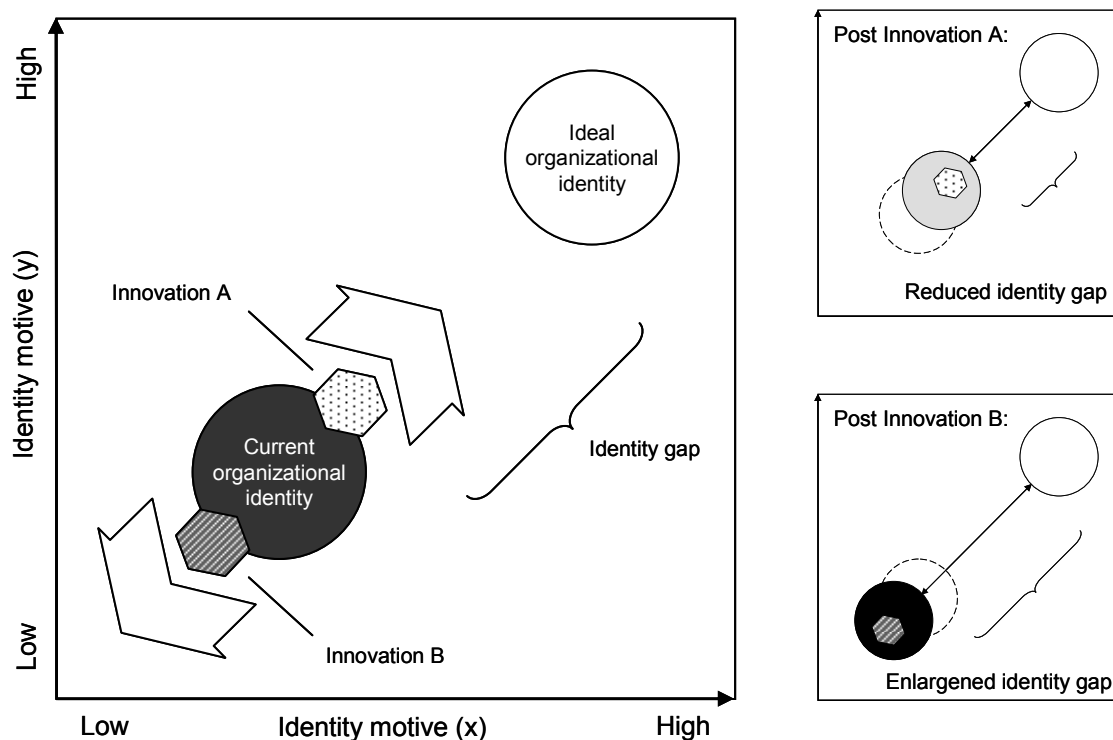


Figure 3.1: The effect of different innovations (A/B) on perceived current org. identity

Second, while perceptions of the current organizational identity are open to modifications by innovations, the *ideal* organizational identity is here conceived as a relatively constant and rigid reference. What makes a possible future organizational identity ideal among all possible alternatives and most desirable to an organizational member is its promise to best meet the member's social identity motives. The ideal organizational identity serves as a reference point to evaluate the innovation and its effect on the current organizational identity.

Third, it follows from the above that the interpretation of *innovations* is guided by comparisons of the current and the ideal organizational identity ('Who are we becoming due to this innovation?') that are again reflected against the member's social identity ('Who am I becoming as a member of this organization due to this innovation?'). Thus, organizational identity comparisons serve as interpretive schemes for the evaluation of innovations. An innovation will be interpreted as moving the current organizational identity towards the ideal when the innovation meets important identity motives of organizational members. The more an innovation

meets a member's identity motives, the more the innovation will appear to him as congruent with his organizational ideal ("This innovation represents who we want to be and stand for as an organization") (see figure 3.2.). In such instances, the image that a member has created of the innovation also resembles his social identity as an organizational member ("This innovation represents who I am and what I stand for as a member of this organization'). The degree of similarity a member perceives between the innovation and his social identity equals his degree of identification with the innovation.

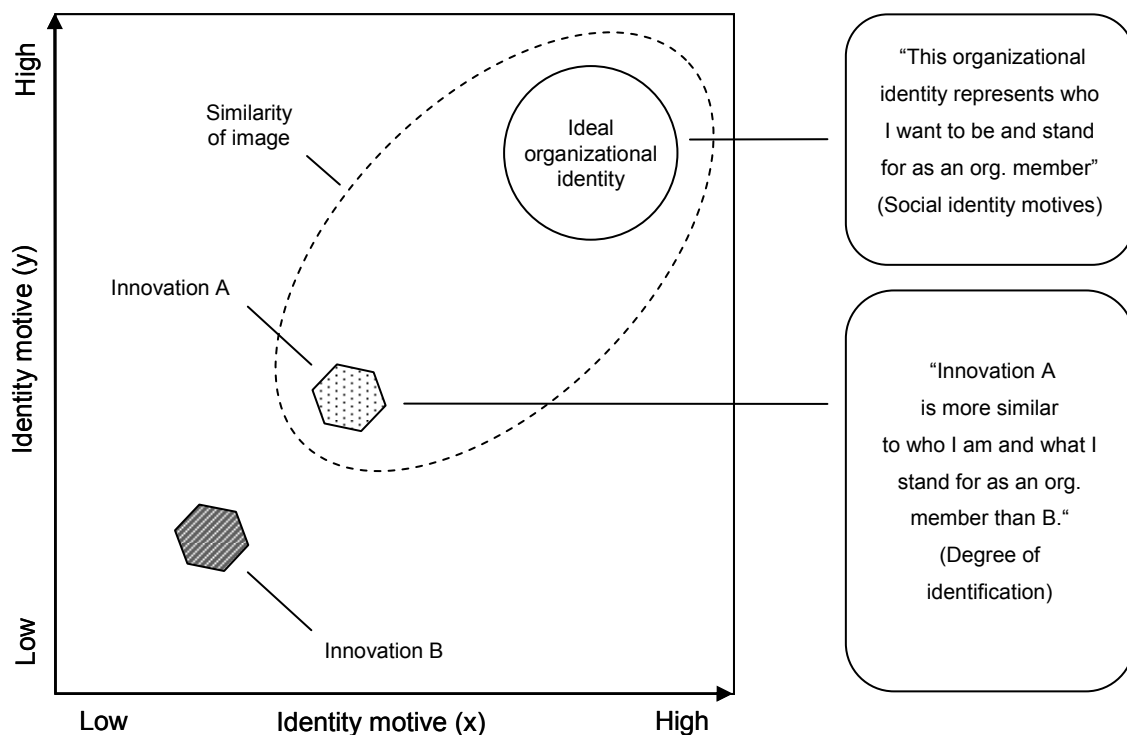


Figure 3.2: Identification with innovations as similarity of image

In sum, members will identify with an innovation to the extent that they perceive it to make the current organizational identity more attractive in dimensions that meet their identity motives as organizational members.

In order to further differentiate this proposition, it firstly needs to be developed which social identity motives are most important to the members' self-concept. Secondly, it needs to be shown which specific organizational dimensions may be capable of

meeting these motives. Determining key identity motives and relating them to organizational identity dimensions will provide a differentiated understanding about which specific aspects of the organization an innovation needs to address in order to achieve member identification with the innovation.

The identity motive of maintaining or enhancing self-esteem was dominant in early formulations of social identity theory (Tajfel, 1982). Meanwhile, social psychology has come to propose a broader array of identity motives, including self-continuity, self-distinctiveness, belonging, self-efficacy, meaning, uncertainty reduction and self-regulations (for reviews, see (Stets & Burke, 2000; Vignoles et al., 2006)). Many of these identity motives are rather new to social psychology and still await further validation (Stets & Burke, 2000). However, three of them have already found consistent empirical support over the past decade in organizational contexts: self-distinctiveness, self-continuity and self-enhancement (Ashforth, 2001; Ashforth, Harrison, & Corley, 2008; Dutton et al., 1994; Shamir, 1991; Steele, 1988). The remainder of the chapter further explores these key identity motives, proposes which dimension of the organizational identity is capable of meeting each motive and concludes that innovation-induced changes in each organizational identity dimension will drive members' identification with the innovation.

3.2.2. Distinctiveness and identification with innovations

The need to see oneself as unique has long been recognized in theories of self and identity (Erikson, 1959; Fromm, 1942; Snyder & Fromkin, 1980). Self-distinctiveness has been argued to be important for identity as a basic human need, as a social value or a means to achieve self-enhancement or meaning (for a review, see (Vignoles, Chrysoschoou, & Breakwell, 2000)). While early research in social identity conceived of distinctiveness as a source of self-esteem, later identity-related research has come to see self-distinctiveness as reflecting a basic need of differentiation that is independent of self-enhancement motives (Brewer, 1991). Self-distinctiveness can not only be achieved by distinguished personal attributes, but also by membership in certain groups which stand out among other groups. In support of this view, research has shown that individuals tend to associate and identify with organizations that they perceive to be relatively distinct (for reviews, see

(Pratt, 1998; Riketta, 2005)). If self-distinctiveness is an important identity motive and the ideal organizational identity is rightly defined as that which best meets those motives, an ideal organizational identity will itself have a high degree of distinctiveness. In consequence, an innovation that enhances the current organizational identity in the distinctiveness dimension will be seen to move the current organizational identity towards the ideal. Such an innovation will itself be seen to carry attributes that are highly desirable for the member and he will perceive a high congruence between his social identity as an organizational member and the image he has created of the innovation. This notion is supported by findings of Vignoles et al. (Vignoles et al., 2006) in social psychology research that individuals generally perceive identity elements as more central to their own identity to the extent that they raise their sense of distinctiveness. Building on the above reasoning and findings, organizational members are expected to identify more with an innovation to the extent that they perceive it to raise their sense of distinctiveness by making their organization more distinct.

Hypothesis 1 (H1): The more an organizational member perceives an innovation to increase the distinctiveness of his organization, the more he will identify with the innovation.

3.2.3. Incongruence and identification with innovations

Individuals value and try to maintain a consistent sense of self over time (Festinger, 1957; Gecas & Burke, 1995; Steele, 1988). Such self-continuity is a strong motive that may in certain contexts be more important to an individual than achieving self-enhancement, even when the upheld identity is socially unfavourable (Swann, 1990). Dutton et al. (Dutton et al., 1994) argued that an organization's identity can add or subtract from a member's sense of continuity, depending on the extent to which it is perceived to be consistent with the member's self-concept. They suggested that members will be attracted to organizational identities that are consistent with their self-concepts, firstly, because such identities are more easily attended to, recalled and favourably interpreted (Markus & Wurf, 1987), and secondly, because they provide members with opportunities for self-expression (Shamir, 1991). This has been more recently confirmed by Chen et al., who have shown at the collective level

that self-verifying information is more easily and more favourably processed than disconfirming information (Chen, Chen, & Shaw, 2004). Based on this research, an organization can be expected to become less attractive to its members when its identity is perceived to be losing internal congruence, because in such instances, members will find it difficult to maintain a consistent social identity over time. A loss in identity congruence can occur if central organizational identity elements such as values, goals and strategic or cultural aspects are perceived to be misaligned and incompatible with each other (Kreiner & Ashforth, 2004). Organizational identification research confirms that individuals disidentify or, at best, ambivalently identify with organizations whose identity they perceive to be incongruent (Kreiner & Ashforth, 2004). Internal congruence will, thus, be another dimension of the ideal organizational identity, which answers to the self-continuity motive of its members. Hence, an innovation that lowers the organization's congruence will be interpreted as moving the current organization's identity away from the ideal. Such innovations will be seen to carry undesirable attributes because they threaten the member's motive for self-continuity. It follows that the image a member holds of such innovations will have little overlap with his social identity as an organizational member, which represents a low level of identification. This proposition is supported by general findings in social psychology that individuals perceive elements as less central to their sense of self to the extent that these lower their self-continuity (Vignoles et al., 2006). Building on the above reasoning and findings, organizational members are expected to identify less with an innovation to the extent that they perceive it to lower their sense of continuity by making their organization more incongruent.

Hypothesis 2 (H2): The more an organizational member perceives an innovation to increase the incongruence of an organization, the less he will identify with the innovation.

3.2.4. Prestige and identification with innovations

Self-esteem, defined as the desire of achieving a positive overall evaluation of the self (Gecas, 1982; Rosenberg et al., 1995), is one of the most studied aspects of the self-concept and has played a central role in social identity-related organizational research since its inception (Ashforth & Mael, 1989) (for a review, see (Pratt, 1998)).

While the self-esteem motive has been conceptually differentiated into efficacy-based self-esteem (self-efficacy) and worth-based self-esteem (self-worth), these aspects can often hardly be kept apart at the experiential level (Gecas, 1982). Hence, they will not be differentiated at this early conceptual stage for the sake of parsimony. Organizational prestige has been frequently argued and found to be a means of enhancing self-esteem, thereby inducing member identification, for example (Bergami & Bagozzi, 2000; Mael & Ashforth, 1992). Organizational prestige is here conceived from a member's point of view as his construed external image (CEI), that is, how a member thinks his organization is externally appraised (Dukerich et al., 2002; Dutton et al., 1994; Gioia et al., 2000). If organizational prestige serves the identity motive of enhancing self-esteem, organizational prestige represents an important dimension of the ideal organizational identity. Innovations which raise the organization's prestige will be seen to move the current organizational identity closer to the ideal. These innovations will be seen as highly desirable and a member's perceived image of the innovation will widely overlap with their own sense of self as organizational members. Again, recent research in general social psychology provides support for this notion, as Vignoles et al. have found that individuals rate identity elements as more central to their self-concept to the extent that these elements enhance their self-esteem (Vignoles et al., 2006). Building on the above reasoning and findings, organizational members are expected to identify more with an innovation to the extent that they perceive it as self-enhancing by making their organization more distinct.

Hypothesis 3 (H3): The more an organizational member perceives an innovation to increase the prestige (CEI) of an organization, the more he will identify with the innovation.

3.2.5. Identification with innovations across different social contexts

The development of an innovation, such as a new product in the present study, is often viewed as a process comprising different stages, which can markedly differ in a variety of aspects (Cooper, 1994, 2008; Crawford & Di Benedetto, 2006; Ulrich & Eppinger, 1995). When adopting the social identity approach, social context comes into focus as a potentially important influence on cognition, affect and behaviour

along the innovation process (see chapter 2.2.2.) and the question should be raised whether it is not necessary to differentiate the social context within which the innovation process is embedded (Granovetter, 1985). Indeed, large differences in social context exist across the innovation process, especially when comparing the mostly internal phases of development and the external phase of commercialization. However, in order to be able to generalize the present theoretical reasoning across the complete innovation process, the hypotheses were consciously derived from fundamental, individual identity motives, which have been found to have general validity independent of social context. The proposed theory thus contends that members will identify with an innovation when they expect it to support their self-distinctiveness, self-continuity and self-enhancement, independently of the innovations' current development stage, that is, its embeddedness in different social contexts. Still, in order to substantiate the context-independent validity and generalizability of this study's theoretical propositions, two studies were conceived and performed that address different social contexts. With one study focussing on an internal development context and the other on an external market context, the empirical section is able to cover the fundamental differences in social contexts that may become relevant throughout innovation processes.

3.3. Methods

3.3.1. Sample and survey

The hypothesized relationships were assessed in the empirical setting of a health-care organization, 'HealthCo', which is a world leader in providing therapeutic solutions in a certain disease indication. A for-profit context was consciously chosen to increase the study's empirical contribution, as most organizational identity and identification research to date has been performed in not-for-profit organizations (Bhattacharya et al., 1995; Dukerich et al., 2002; Gioia & Thomas, 1996; Golden-Biddle & Rao, 1997; Mael & Ashforth, 1992; Olkkonen & Lipponen, 2006).

Large-scale, quantitative data collection was preceded by a qualitative research phase of several months, which served to comprehensively understand HealthCo's identity as well as its innovations. Over a period of several months, internal

documents and data were collected and examined; several full days were spent at the company and in the field with the sales forces and a total of over 30 interviews lasting between 1 and 2.5 hours were conducted across all hierarchies. The interviews were spread across all organizational units and included the complete top management team. Each interview was performed in an open-ended fashion and analyzed after completion. Insights arising from interview data and from ongoing literature reviews were taken into account in subsequent interview rounds so that the theoretical propositions of the study could be sharpened iteratively (Glaser & Strauss, 1967). The interview data did not reveal major differences in perceptions of organizational identity between members from different organizational units. This was interpreted as evidence that HealthCo's organizational identity is of the holographic type and thereby present in each organizational unit (Albert & Whetten, 1985).

In order to control as much as possible for transient, contextual 'noise', the subsequent analysis was focussed on a specific part of the organization. Working with a relatively homogeneous unit promised to more precisely capture cognitive differences between individuals. Again, if the organizational identity was correctly assessed to be of a holographic nature, our findings can legitimately be generalized across the organization. A focus on the salesforce of the organization was chosen for several reasons. Firstly, the salesforce represents the organizational unit whose contribution is highly critical for the success of the innovation at launch (di Benedetto, 1999), which is, again, key for an innovation's overall performance (Hultink et al., 1997; Hultink et al., 2000; Hultink & Robben, 1999; Kleinschmidt et al., 2007). Thus, achieving a high level of identification among the salesforce is of premier relevance. Secondly, it was by far HealthCo's largest and thereby most representative organizational unit. Thirdly, prior research has shown that social comparison phenomena are highly relevant at the organizational boundaries (Bartel, 2001), as accessibility and fit of the organizational category are especially high in the face of competing 'outgroups'. Fourthly, boundary-spanning organizational members have seldom been the subject of organizational identity and identification research (for recent exceptions, see (Ahearne et al., 2005; Bartel, 2001; Richter et al., 2006).

Two studies were performed, each focussing on one innovation that differed from the other mainly by its development stage. Both innovations represented therapeutic

product/market innovations within the companies' most important therapeutic areas. They were novel in terms of including new product features or different regimes of administration and addressing customer segments that had not previously been targeted by the company.

The introduction of the first innovation (Inno1) was internally announced shortly after the qualitative research phase had begun and was launched a few months afterwards. Survey data for Inno1 was collected six months into its launch phase. At this time, the second innovation (Inno2) had just been internally announced to the salesforce and indicated to be launched within a few months. This situation thus represented a unique opportunity to gather data by means of the same instrument in the same organization for studying two innovations in different social contexts: Inno1 had recently been launched and thereby reached an external market context, while Inno2 was still in an internal development context, having just been internally announced (Inno2). As both studies used the same constructs, the following discussion on measures is also applicable to both. The two studies are differentiated when their specific results are reported and discussed.

A multisection survey instrument was developed consisting mostly of established scales, which were adapted to the present research question. The questionnaire was pre-tested and subsequently sent by regular mail with a cover letter to all 200 salesforce members involved in the launching of Inno1 and Inno2. Also included in the mail package was a cappuccino pad to entice both the willingness to participate as well as the completion of the questionnaire in a moment of tranquillity. A total of 154 usable questionnaires were returned after one reminder, resulting in a 77% response rate. Respondent demographics were as follows: 69% were female, 41% had a higher education (graduate or post-graduate degree), average tenure was about eight years and 51% of the members were assigned to the southern sales region.

3.3.2. Measures

Distinctiveness effect

Sheldon and Bettencourt's three-item scale of group distinctiveness (Sheldon & Bettencourt, 2002) was used as a basis for measuring the effect that an innovation has on perceived organizational distinctiveness. Vignoles et al. have shown that group distinctiveness can be conceptualized as consisting of the three dimensions 'difference', 'position' and 'separateness' (Vignoles et al., 2000; Vignoles, Chryssochoou, & Breakwell, 2002). Sheldon and Bettencourt's construct covers the difference and position dimensions of distinctiveness. To ensure a complete representation of the construct domain, an item covering separateness from a scale developed by Vignoles et al. (Vignoles et al., 2002) was added. Finally, a fifth item was also included, based on an expression of difference that had repeatedly been brought up by organizational members throughout the interviews. In their original form, these items gauged organizational distinctiveness as perceived in its current state. However, as the study's focus is on how organizational distinctiveness is perceived to change due to an innovation, the items had to be modified accordingly. Each item was reformulated as a statement about the perceived impact of the innovation on the organization's distinctiveness. Respondents indicated on a 5-point Likert scale (Likert, 1932) to what extent they agreed or disagreed with them. Wherever Likert scales are used in this study, 5-point scales are chosen over alternatives with more categories in order to lower ambiguity in interpretation of the response categories. Choosing a higher number has not been found to improve data characteristics substantially (Dawes, 2008), especially when opinions towards the measured content diverge widely (Masters, 1974), which is the case in the present study. Sample items of the distinctiveness scale included, for example, "*This innovation makes HealthCo more different from its competitors*", or "*This innovation makes HealthCo seem more unique, compared to its competitors*". Exploratory and confirmatory factor analyses were performed, which led to the exclusion of two items. The remaining items were averaged to create a single distinctiveness effect score. Coefficient alphas were .94 for Inno1 and .96 for Inno2 (for further details, see chapter 8.4.).

Incongruence effect

An established 6-item scale was available for measuring organizational incongruence from the organizational identity literature (Kreiner & Ashforth, 2004). Interviews had provided confidence that respondents could conceive how an innovation may create incongruence in HealthCo's identity. Again, all items were reformulated in order to capture the perceived impact of the innovations on organizational identity incongruence. Final items include, for example, "*This innovation leads to HealthCo standing for contradictory things*", or "*This innovation leads to HealthCo's major beliefs being less consistent*". Two items were excluded after exploratory and confirmatory factor analyses were performed. The remaining items were averaged to a single score with reliabilities of .88 for both Inno1 and Inno2 (for further details, see chapter 8.4.).

Prestige effect

The perceived effect of innovations on organizational prestige was captured based on two widely used scales, that is, collective self-esteem (Luhtanen & Crocker, 1992) and perceived organizational prestige (Mael & Ashforth, 1992). Three items of Mael and Ashforth's scale were specific to the university context of their study and were not adequate for our for-profit context. The resulting combined set of nine items was reworded so that it captured the effect of innovation on organizational prestige. Pre-tests revealed that three items were viewed as either redundant or of little relevance, leaving a scale of six items. Pre-tests also indicated that respondents found it helpful to think of organizational prestige in the eye of a specified reference group instead of a 'generalized other' (Dodds, Lawrence, & Valsiner, 1997; Mead, 1934). This is consistent with the notion that social identity salience is dependent on social context. The customer segment towards which both innovations were targeted (i.e., general practitioners) was identified as a highly relevant reference group. Social identity is highly salient when sales representatives relate to customers, because in such contexts, categorization as an organizational member provides a good comparative and normative fit (see chapter 2.2.3.). Final items included, for example, "*This innovation leads to HealthCo being, overall, considered better by general practitioners*", or "*This innovation leads to general practitioners thinking more highly of HealthCo*". Exploratory and confirmatory factor analyses were performed that led

to further exclusion of two items, one of which was not unexpected, as this item from Mael and Ashforth's scale really referred to individual and not group prestige. Reliabilities for the resulting 3-item scale were .92 for Inno1 and .91 for Inno2 (for further details, see chapter 8.4.).

Identification with an innovation

Organizational research has developed and fruitfully applied a broad range of measures for identification (for recent reviews, see (Bergami & Bagozzi, 2000; Pratt, 1998; Riketta, 2005; van Dick, 2001). Bergami and Bagozzi's measure of self-categorization was chosen, which captures the degree of overlap between self-image and the perceived image of an organization (Bergami & Bagozzi, 2000). This measure has proven reliable and useful in organizational identification research (Ahearne et al., 2005; Bartel, 2001; Dukerich et al., 2002). It fits well the study's understanding of identification with an innovation as the perceived congruence of the image of an innovation with the self-image of an individual as an organizational member ('does this innovation represent who I want to be as an organizational member?'). Other widely used measures, such as Mael and Ashforth's scale (Mael, 1988; Mael & Ashforth, 1992), include items that have been argued to not only tap cognitive, but also affective or behavioural aspects (Bergami & Bagozzi, 2000). While these aspects have in other works been argued to belong to an overarching concept of identification (van Dick, 2001; van Dick et al., 2004), the present study focuses on the cognitive aspect, that is, categorizing one's image of self jointly with the image one holds of the identification target. By limiting itself to the cognitive aspect of identification, Bergami and Bagozzi's scale has high discriminant validity against related concepts such as affective commitment and may thus be especially useful for an assessment of the causes and effects of self-categorization (Bergami & Bagozzi, 2000). The wording of the items – visual and verbal – was modified to refer to the innovation as the identification target instead of the organization. Confirmatory factor analyses were successfully performed and the items were averaged to create a single score. Reliabilities for the scores were .92 in study 1 and .93 in study 2 (for further details, see chapter 8.4.).

Control variables

Several control variables were also included. The first three – *gender*, *age* and *education* – were demographic controls that are traditionally used in person-organization research (Kreiner & Ashforth, 2004). Moreover, age and the level of education have been shown to be related to innovative cognition and behaviour (Mumford & Gustafson, 1988). *Tenure* was also controlled for to account for the possibility that over time, a salesperson may settle into routines and be unwilling to change when faced with innovative approaches (Behrman & Perreault Jr., 1984; Cron, 1984). Two additional reasons for including tenure were closely related to previous theoretical insights. Firstly, members who have remained with an organization for a long time apparently have not used social mobility but rather social creativity or change strategies (Tajfel & Turner, 1979) to cope with prior organizational identity gaps. Longer-tenured members may thus have successfully reduced identity gap perceptions in the past, resulting in perceptions of a relatively narrow gap in the present. With increasing tenure, members may thus tend to perceive the current organizational identity as closer to the ideal. The more the current organizational identity is perceived to be ideal, the more probable it is that anything truly novel to the organization will be seen as widening the identity gap. Secondly, if a gap is perceived to remain wide over time and social creativity, change or mobility strategies have failed, the gap is expected to lose its motivational drive, as members have internally distanced themselves from their organizations. In summary, organizational tenure is expected to be negatively related to identifying with innovations. The regional *area* to which a salesforce member belonged was also controlled for, as the innovations were introduced by two different regional leaders for the northern and the southern parts of the country. Prior research has shown that members display greater loyalty towards leaders who they perceive to be highly prototypical for their category (Ellemers et al., 2004; Hogg, 2001), even in cases where leaders display deviant, undesirable behaviours (Bruins, Ellemers, & De Gilder, 1999). Hence, the reception and interpretation of an innovation could partly depend on the perceived characteristics of the leader who introduces it. A control that was specific for the study of the launched innovation (Inno1) was the amount of *time* members had spent with new customers speaking about the innovation. This variable was considered because individuals have been shown to display higher commitment

(a concept close to identification) towards targets for which they have made personal investments (Buchanan, 1974; Sheldon, 1971). In sum, while the above variables are included as 'controls' – because they represent alternative explanations that are outside the main theoretical interest of the study – some of them represent interesting theoretical issues that have not yet been conclusively solved.

3.4. Results

3.4.1. Study 1

Bivariate correlations of all variables included in the first study on Inno1 are shown in table 3.1. Predictor variables were significantly correlated with the criterion variable for the main effects. Predictors showed moderate levels of correlation among each other. This did not come as a surprise, as innovations were expected to often impact more than one facet of the organizational identity at a time. In view of these correlations, collinearity was tested following Belsley, Kuh and Welsch (Belsley, Kuh, & Welsch, 1980). Collinearity proved not to be an issue, because the highest variance inflation factor was 1.57 for a main effects predictor variable and 2.52 for a control variable. Also, the conditioning number of the matrix of independent variables did not exceed 30.

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10
1. Identification with Innovation (1)	5.79	1.34	(.92)									
2. Age	4.92	1.88	.00	-								
3. Gender (female=1)	.69	.46	.07	-.22 **	-							
4. Education (graduate+=1)	.41	.49	.04	.12 †	-.13 †	-						
5. Tenure	8.06	6.55	-.16 *	.75 ***	-.12 †	.06	-					
6. Area (south=1)	.51	.50	-.21 **	.05	-.01	.03	.12 †	-				
7. Time spent	.42	.17	.02	-.32 ***	.07	.17 *	-.29 ***	-.02	-			
8. Distinctiveness effect of Innovation (1)	3.07	1.03	.47 ***	-.04	.00	-.07	-.07	-.21 **	-.01	(.94)		
9. Incongruence effect of Innovation (1)	2.44	1.08	-.49 ***	.18 *	-.02	.07	.19 *	.15 *	-.02	-.52 ***	(.88)	
10. Prestige effect of Innovation (1)	3.62	.88	.51 ***	-.03	.03	-.03	-.05	-.33 ***	.08	.47 ***	-.40 ***	(.92)

n=154. Reliability measures (Cronbach's alpha) are on the diagonal.

† $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Table 3.1: Descriptive statistics and correlations (Inno1)

Ordinary least squares regression analyses were performed for all hypothesized relationships. Results are shown in table 3.2. and provide support for all hypotheses regarding Inno1 (H1-H3). Members identified more strongly with Inno1 when they perceived it to increase organizational distinctiveness and organizational prestige. They identified less with Inno1 when they viewed it to raise organizational identity incongruence. It should be noted, though, that perceived changes in organizational prestige ($p < .001$) and incongruence ($p < .001$) were stronger and more significant predictors for members' identification with Inno1 than perceptions of change in organizational distinctiveness ($p < .05$). The overall regression model reached an R^2 of .44, to which the social identity-derived antecedents contributed .34.

Step and Variable	Model 1	S.E.	Model 2	S.E.
Controls				
Age	.28 *	.09	.31 **	.08
Gender (female=1)	.10	.25	.10	.20
Education (graduate+=1)	.05	.24	.08	.19
Tenure	-.34 **	.03	-.31 **	.02
Area (south=1)	-.18 *	.23	-.01	.19
Time spent	-.01	.72	-.02	.58
Main effects				
Distinctiveness effect of Innovation (1)			.17 *	.11
Incongruence effect of Innovation (1)			-.28 ***	.10
Prestige effect of Innovation (1)			.31 ***	.12
R^2	.10		.44	
R^2 adj.	.06		.40	
Overall F	2.43 *		10.85 ***	

n=154. Standardized coefficients are shown. DV: Identification with Innovation (1)
[†] $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$; all two-tailed

Table 3.2: Regression models for identification with innovation (Inno1)

Some of the controls' contributions to explaining identification with Inno1 were also noteworthy. The member's age and tenure were both significantly associated with their identification with innovations, but, somewhat surprisingly, in opposite directions. While a longer tenure was associated with weaker identification levels ($p < .01$), a higher age was predictive of stronger identification levels ($p < .01$). Another interesting finding is that the area to which a member belonged was a significant predictor for his identification with Inno1 ($p < .05$). This was only true in Model 1, though. When the main effects that capture members' perceptions of Inno1 were added in Model 2, the

area effect vanished completely ($p=.88$). Gender and time spent with innovation were not significant predictors of members' identification with Inno1 in both models.

3.4.2. Study 2

As has been laid out in chapter 3.3., a second study was performed to, firstly, provide replication and further validation for the above findings and, secondly, ensure the findings were consistent, independent of different social contexts. While study 1 had focussed on an innovation that had already been launched into the market (Inno1, external context), study 2 focussed on an innovation that was still in development (Inno2, internal context). The models run in study 2 in order to gauge the determinants of identification with Inno2 were equivalent to those used in the first study. Also, the set of predictor and criterion variables remained the same as in the prior study, with one exception among the controls. The control '*Time spent on innovation at the customers*' was not applicable to Inno2, as it had not yet been launched. Table 3.3. and table 3.4. present bivariate correlations and results from OLS analyses, respectively.

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9
1. Identification with Innovation (2)	5.81	1.83	(.93)								
2. Age	4.92	1.88	-.08	-							
3. Gender (female=1)	.69	.46	.04	-.22 **	-						
4. Education (graduate+=1)	.41	.49	-.08	.12 †	-.13 †	-					
5. Tenure	8.06	6.55	-.10	.75 ***	-.12 †	.06	-				
6. Area (south=1)	.51	.50	.00	.05	-.01	.03	.12 †	-			
7. Distinctiveness effect of Innovation (2)	2.62	1.27	.50 ***	.00	.05	-.12 †	-.04	-.05	(.96)		
8. Incongruence effect of Innovation (2)	2.93	1.23	-.47 ***	-.13 †	-.07	.06	-.03	.15 *	-.50 ***	(.88)	
9. Prestige effect of Innovation (2)	4.02	.91	.50 ***	-.13 †	.06	-.06	-.03	-.05	.34 ***	-.19 *	(.91)

$n=154$. Reliability measures (Cronbach's alpha) are on the diagonal.

† $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Table 3.3: Descriptive statistics and correlations (Inno2)

Again, predictor variables showed moderate amounts of correlation among each other, and low variance inflation factors and conditioning indices indicated that collinearity was not an issue (Belsley et al., 1980). Concordant with Study 1, all hypothesized relationships (H1-3) were supported when assessing Inno2. The total R^2 of the model reached .45, which was also very similar to Study 1.

Step and Variable	Model 1	S.E.	Model 2	S.E.
Controls				
Age	.00	.13	-.03	.10
Gender (female=1)	.02	.36	-.03	.27
Education (graduate+=1)	-.07	.33	.00	.25
Tenure	-.10	.04	-.08	.03
Area (south=1)	.01	.32	.09	.24
Main effects				
Distinctiveness effect of Innovation (2)			.22 **	.11
Incongruence effect of Innovation (2)			-.31 ***	.12
Prestige effect of Innovation (2)			.37 ***	.14
R^2	.02		.45	
R^2 adj.	-.02		.42	
Overall F	.42 n.s.		13.15 ***	

n=154. Standardized coefficients are shown. DV: Identification with Innovation (2)

† $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$; all two-tailed

Table 3.4: Regression models for identification with innovation (Inno2)

The fact that both studies yielded consistent findings provided initial evidence that the postulated main effects could be observed across different stages of the new product development process. They were valid for an innovation that was still under development in an internal social context (Inno2) as well as one that had already entered the launch stage, including an external social context (Inno1).

Both studies differed in two findings. Firstly, H1 found stronger support in Study 2 ($p < .01$) than in Study 1 ($p < .05$). Organizational distinctiveness expectations caused by an innovation were a stronger predictor in a pre-launch setting than in a post-launch situation. Secondly, it came as a surprise that no control reached significance in study 2, while age, tenure and district had displayed significant explanatory power for the launched innovation in Study 1. Table 3.5. summarizes the chapter's findings.

Hypotheses		Findings
Cognitive identification with the innovation (Studies 1&2)		
H1:	Distinctiveness effect of innovation →	Cognitive identification with innovation (+) supported
H2:	Incongruence effect of innovation →	Cognitive identification with innovation (-) supported
H3:	Prestige effect of innovation →	Cognitive identification with innovation (+) supported

Table 3.5: Findings for hypotheses H1-3

3.5. Discussion

Theoretical implications

This chapter started out by recognizing that extant research on organizational identity and identification has mostly focussed on members' perceptions of the *current* organizational identity. Such emphasis on current organizational identity may have led to the preponderant view that organizational identity acts as an inertial force within organizations. This chapter proposed, however, that shifting the perspective from current identity perceptions to idealized identity expectations and to their dynamic interrelation could lead to different conclusions. Ideal organizational identity, which was defined as the organizational identity that members envision to best meet their own identity motives, was suggested to act as a scheme guiding members' interpretations of innovative organizational actions. The core proposition was that members would identify with innovative actions when they perceived these innovations to reduce the distance between current and ideal organizational identity. Five major conclusions can be drawn from the present findings:

Firstly, it appears that innovations indeed influence the members' perceptions of their organization's current identity. High reliabilities and validities of the newly developed antecedents provided confidence that organizational members were effectively interpreting innovations as cues about who the organization is becoming. Such perceptions were strongly associated with the members' level of personal identification with the innovation. More precisely, members recognized innovations as highly congruent with themselves as organizational members when they perceived them as enhancing the organizational identity in important self-definitional dimensions. These conceptual and empirical insights represent the study's major contributions to extant research. While comparisons between identity perceptions

and expectations had hitherto been conceptually viewed in a rather static way, this chapter added a dynamic perspective by showing how innovative organizational actions change perceptions of the current organizational identity and modify the currently perceived identity gap. Moreover, while previous research on such identity comparison processes had focussed on organizations as targets of identification, the present chapter extends the approach in showing that innovative actions which change perceptions of organizational identity may become targets of identification as well.

Secondly, the present study also clearly shows that the interpretation of an organization's innovative actions may vary considerably among its members. While some members evaluated a specific innovation clearly as positively enhancing the organizational identity along important dimensions, others saw the very same innovation as having a pronouncedly negative impact. Thus, whether an organizational action is recognized as a threat or as an opportunity with all the related consequences (Jackson & Dutton, 1988) appears to be in the eye of the organizational member and guided by the interpretive scheme of perceived organizational identity. The existence of such differences between members, then, points to the need for diligent organizational identity management, which should accompany any innovative change process. Such managerial tasks will be discussed in further detail in chapter 6.

Thirdly, the findings fully confirmed that organizational identity aspects guide the interpretation of organizational actions when they address members' social identity motives of self-distinctiveness, self-continuity and self-enhancement. Members' perception of the innovations' impact on organizational distinctiveness, congruence or prestige played a key role for the members' level of identification with the innovation, explaining nearly half of its variance (including controls). Interestingly, regression models revealed that distinctiveness effects were less strongly associated with identification than prestige effects. A tentative explanation may be that members do not look primarily at their organizations as vehicles for achieving self-distinctiveness. Organizations are typically rather large and diverse social groups and may thus offer limited opportunities for accentuating individual distinctiveness. Members may have other opportunities within the organizational realm to more

effectively support their sense of being unique and different from others. As social identity research has argued, members of larger organizations may recur to smaller, intraorganizational identification targets that are better apt to meet their need for self-distinctiveness, for example their strategic business unit, department or project team. Identification at the larger organizational level may thus not serve a need for distinctiveness, but inclusiveness (Brewer, 1991). If members attach relatively little personal value to group distinctiveness at the organizational level, it can also be expected that they will not care much when it changes through innovative actions. If so, the evaluation of innovative actions should not be strongly influenced by their impact on organizational distinctiveness. This could explain why distinctiveness effects of an innovation were only weakly associated with identification levels, although members were clearly capable to discriminate distinctiveness effects from prestige and incongruence effects. The two predictors that remain of premier importance at the organizational level, then, are an innovation's perceived effect on the organization's prestige and its congruence.

Fourthly, the present results also challenge the common notion that older individuals find it more difficult to accept innovations. On the contrary, age was even significantly positively associated with members' identification with the launched innovation (Inno1). However, its close correlate, tenure, was confirmed as a negative predictor for members' identification (Inno1). This surprising divergence between age and tenure may indicate that the ageing of a workforce is not *per se* an issue for the innovativeness of an organization. The present results rather suggest that older members only become a hindrance for the successful implementation of innovations when they stay within the same organization for many years. This may point, again, towards the function of organizational identity as a scheme for guiding interpretation of organizational actions. The identity gap between current and ideal perceptions of the organizational identity can be expected to be relatively small for longer-tenured members because their staying with the organization evidences that they have been able to mitigate dissatisfaction with their organization's identity through real changes or changes in perception, instead of leaving the organization. In Tajfel and Turner's words, they have been able to successfully exert social change or social creativity strategies instead of social mobility strategies (Tajfel & Turner, 1979). If longer-tenured members can be generally characterized as perceiving a smaller identity

gap, then their perception of the ideal organizational identity, that is, their scheme for interpreting the innovation will tend to be relatively close to their view of the current identity. In consequence, most changes to the currently perceived identity will be viewed by them as widening the gap instead of narrowing it. Thus, the interpretive scheme of the organizational identity which forms during members' tenure and not their ageing processes may be the root cause that makes it difficult for them to identify with innovations.

Fifthly, the present studies illustrate how organizational identity insights can be fruitfully integrated with innovation research. More specifically, they provide evidence that organizational identity represents an interesting avenue for studying 'cultural' influences in innovation processes. The studies evidence the explicitness and instrumentality of the identity concept (Schultz, Hatch, & Larsen, 2002) and thereby exemplify how organizational identity can serve as a way to solve the difficulties in assessing and capturing cultural aspects of an organization (Fiol, Hatch, & Golden-Biddle, 1998). The present studies thus complement extant innovation literature in the new product development (NPD) area, which has focussed on behaviours and largely ignored cognitive influences (Ernst, 2002).

In conclusion, the results stress the importance to progress beyond a simplistic understanding of resistance to innovations. Resistance to innovations cannot be reduced to a general reluctance to change due to the unwillingness of organizational members to give up familiar routines and habits. Rather, the present studies provide a more sophisticated understanding which acknowledges that members may often withstand innovative change because they wholeheartedly believe that resistance is in the organization's very best interest. In explaining the determinants of employee identification with innovations, the present studies not only provide a more grounded account of member acceptance of or resistance to innovations, but also offer very specific levers for creating and managing identification with innovations. Such managerial options, which can be derived from the present results, will be discussed in detail in chapter 6.

Limitations and future research

Results and conclusions need to be viewed in light of the present studies' conceptual and methodological limitations. Firstly, the studies adopted a simple and straightforward understanding of identification in order to be able to parsimoniously integrate insights from organizational identity, social identity and innovation within a single conceptual model. The present research thus only differentiated between different degrees of identification, from low to high. Recent research in organizational identification suggests that it may be fruitful to consider additional forms of organizational identification. For example, Elsbach proposed and Kreiner and Ashforth tested an expanded model, proposing additional dimensions of identification, including neutral identification, ambivalent identification and disidentification (Elsbach, 1999; Kreiner & Ashforth, 2004). They were able to show that such dimensions of identification were related to different antecedents. It would be interesting to consider to what extent their model could be applied to the present model of identification with innovations. For instance, Kreiner and Ashforth showed that perceptions of organizational incongruence were strongly associated with disidentification. They argued that disidentification differs from a low level of identification in representing an active separation from the organization, possibly including a repulsion of the organization's mission, culture or centrally defining features (Elsbach, 1999; Elsbach & Bhattacharya, 2001). While not probable in the present case, it is easily imaginable that an innovation may be perceived to dramatically alter organizational identity for the worse, so that members would not only show a low level of identification, but actively resist it. Another extension of the concept of identification consists in differentiating the cognitive, affective, evaluative and conative dimensions of the identification concept (van Dick et al., 2004). While the present chapter has limited its focus on the cognitive aspect for the sake of parsimony, chapter 5 will examine additional dimensions.

Secondly, careful attention was paid in deriving antecedents from within the theoretical domain of the social identity approach. Still, in view of the fact that about half of the variance in the identification construct remained unexplained by the chosen determinants, additional antecedents can certainly be found which are independent of the organization's identity. For instance, it is imaginable that the studied innovations may also have had an effect on the members' perceptions of the

roles that they were expected to fulfil as salespersons, because customer segments, selling strategy or style were somewhat modified due to the innovation. Hence, salesforce members may have perceived that they were not the same salesperson as before, with their role having changed for better or worse due to the innovation. Assessing an innovation's impact on individuals' role identities may be an additional driver of identification and could be studied in similar manner to this present work. This study did not focus on role identity, as the primary interest lay in conceptually developing and empirically testing the relationship between an organization's innovation and members' organizational identity perceptions.

Thirdly, the present study largely assumed that social identity as organizational members was equally salient and equally important to all respondents. Generally speaking, this assumption certainly represents a rough simplification of the reality, because social identity research has clearly shown that the salience of an individual's social identity is often dependent on context. However, the specific empirical context of the study allowed for this simplification without compromising its validity. Salespersons spend most of their time every workday in situations where they are viewed and treated as representing their organization. Thus, their social identity as sales representatives was expected to be chronically accessible and thereby highly salient (Oakes, 1987). In other words, organizational members were assumed to have developed a deep-structure type of identification with their organization (Rousseau, 1998), which implies that their social identity salience was not necessarily dependent on situational cues. This notion was supported by the fact that interviews did not reveal apparent differences whether they were performed in private home or professional work contexts. To be sure, the interviews and the questionnaire provided cues that addressed the individuals as organizational members and thus made the desired social identity salient. Taken together, there was confidence that respondents saw themselves as organizational members when filling out the questionnaire. Nevertheless, future studies should assess to what degree certain differences in social identity salience and identification with the organization may moderate the present findings. For instance, it may be possible that members who weakly identify with their organization are less concerned about an innovation's impact on the organization, but may still strongly identify with the innovation when it enhances their role identity as salespersons, independent of the organization.

Fourthly, another simplification was the assumption that all members were similar as to their individualistic or collectivistic disposition. Individualists can be characterized as giving higher priorities to their personal needs, while collectivists care for their group, even when this may be detrimental to their personal interests (Wagner, 1995). Identification research has shown that social identification phenomena are more pronounced among collectivists (Triandis, 1989; Triandis, McCusker, & Hui, 1990). Such research has mostly tied differences in individualism-collectivism to differences in national cultures. As the present work was performed within a single country among a group of individuals who largely shared the same cultural background, differences in individualism or collectivism were not explicitly controlled for. However, some more recent work suggests that such distinctions may be fruitful even when studying individuals of the same national culture, for example (Gundlach, Zivnuska, & Stoner, 2006). Future research could explicitly consider whether and under what conditions individualists or collectivists tend to be more receptive of innovations. For instance, it could be expected that individualists may be induced to identify by innovations when the innovations promise personal benefits to them (e.g., bonus expectations), and be less concerned whether such innovations have an impact on their organization's identity.

Fifthly, the present studies only assessed two different innovations. As a consequence, generalizations of findings to different stages of the innovation process as well as different kinds of innovations need to be understood as tentative and preliminary. They certainly await confirmation in different industries, types of innovations and stages of development. It is easily conceivable that not all types of innovations may be related to the organizational identity to the same degree. For instance, an organization's innovative products may act as stronger cues for members' perceptions of the organizational identity than other intraorganizational innovations such as new organizational processes or the introduction of new workplace technologies. Therefore, future research could assess the validity of the social-identity-based reasoning presented in this chapter for additional types of organizational innovations.

Finally, typical methodological limitations of cross-sectional data apply. When bivariate and multivariate analyses are performed based on data from a single survey instrument at the same point in time, they cannot be postulated to unambiguously support a causal relationship. As the main effects under study all belong to the realm of individual cognition, it could well be that the current account, which proposes a strictly sequential process from cognitive antecedents to cognitive outcomes, may represent a rough simplification. It seems probable that the main effect variables will iteratively influence each other in a reciprocal process. More specifically, a member who has started to identify with an innovation because it appears to support the current organizational identity may be predisposed to additional information that affirms his assessment. Thus, the more a member identifies with an innovation, the more it may appear to him as enhancing the organization's identity. However, this secondary, reciprocal effect should be weaker than the primary effect that was hypothesized here, as the secondary effect is largely based on a cognitive bias, while the primary effect is grounded in a member's cognitive categorization, as will be laid out in the following chapter.

4. Innovation Prototypicality: Untangling the Cognitive Process of Identifying with Innovations

4.1. Introduction

The previous chapter has offered theoretical reasoning and empirical evidence that organizational members identify with innovations to the extent that they perceive these innovations to enhance the distinctiveness, congruence or prestige of their organization. This chapter now delves deeper into this cognitive adoption process by resorting to categorization theory (Rosch, 1978). Categorization theory is compatible with social identity theory as it represents an important theoretical basis for self-categorization theory (SCT) (Turner et al., 1987), which is a specific strand of the social identity approach, as was laid out in the theoretical review of SCT in chapter 2.2.3.

Starting with Porac and Thomas' seminal work (Porac & Thomas, 1990), organizational research has applied categorization theory (Rosch, 1978) to the *interorganizational* level of analysis. These studies argue that individuals cognitively assign organizations to a certain category by matching their known attributes to typical attributes of the category (Porac & Thomas, 1990). Organizations which are jointly classified into one category (e.g., the same industry sector) are expected to share similar capabilities, products and other attributes (Porac & Thomas, 1995; Porac, Wade, & Pollock, 1999). For instance, organizations that have certain capabilities in the area of medical research and development and that produce or market some type of therapeutic agent and subject their internal processes according to certain regulatory requirements would typically be characterized as belonging to the pharmaceutical industry category. This chapter extends the application of categorization principles from the interorganizational to the *intraorganizational* domain. Instead of viewing a group of organizations as forming a cognitive category at the interorganizational level (e.g., an 'industry sector'), intraorganizational elements are viewed as forming a category at the organizational level (e.g., a 'firm'). Intraorganizational elements of an organization can widely diverge and can include, among other things, its members, products and services, structures or processes.

These intraorganizational elements are here conceptually developed to jointly form a single cognitive category.

Applying categorization principles to the organizational level is not *per se* new to organizational research. Self-categorization theory (SCT) (Turner et al., 1987) was introduced by Hogg and Terry to the organizational domain (Hogg & Terry, 2000) and has since been fruitfully applied (for a recent review, see (Hogg et al., 2004)). The present study differs from prior applications of SCT to organizations by adopting a broader view of organizations and by applying categorization principles to a more diverse set of intraorganizational elements. From the SCT perspective, organizations are typically viewed as social groups that are essentially composed of individual members. This may be owed to SCT's focus on understanding individuals' cognitive categorization processes within social groups (see chapter 2.2.3.). When applying categorization insights to organizations, SCT has consequently been limited to only one type of intraorganizational elements, the organization's members. For instance, categorization principles have been argued to influence individuals' motivations at work (Ellemers et al., 2004), their social status (Elsbach, 2003a), their endorsements of leaders and leader effectiveness (Ellemers et al., 2004; Hogg & Terry, 2000). This chapter adopts a broader and more generalized approach by positing that categorization principles cannot only be applied to the organization's individual members, but also to a range of other intraorganizational elements, including innovative products or processes. It thereby extends previous research by explicitly recognizing that organizations are more than social groups, being constituted by more elements than just their individual members. For instance, in for-profit organizational contexts, additional constitutive elements of organizations typically include their structures, processes, products and services as well as other tangible and intangible assets. This chapter thus aims at applying insights from categorization theory to organizational elements other than the organization's individual members.

In conclusion, the present chapter extends the application of categorization insights to organizational research in two major ways. Firstly, while prior organizational research has applied categorization theory to interorganizational categories (e.g., industry sectors), of which organizations are the constitutive elements (Porac & Thomas, 1990), it is here applied to organizational categories (e.g., firms) that are

composed of intraorganizational elements. Secondly, the present approach widens the stream of organizational research that has adopted SCT (Hogg & Terry, 2000; Turner et al., 1987) by applying it to other intraorganizational elements than its individual members. The specific type of intraorganizational elements on which the present study focuses are innovations such as new products or processes (West & Farr, 1990). As elements of a cognitive category, innovations vary in their degree of *prototypicality*, which has been defined as the degree to which an element of a category fits the idea or image of the meaning of the category name (Rosch & Mervis, 1975). This chapter provides theoretical reasoning and empirical evidence that an innovation's prototypicality for the organization mediates the relationships between an innovation's perceived organizational identity effects (distinctiveness, incongruence, prestige) and members' identification with the innovation. The application of categorization theory thereby allows to develop a deeper understanding of why and how organizational identity perceptions influence member identification. Results testify that an in-depth understanding of these relationships may be critical to successful innovation management.

Before categorization insights can be applied to organizations and their intraorganizational elements, it needs to be established that single organizations indeed serve as cognitive categories and display their characteristics. The next section attempts to develop a view of organizations as cognitive categories in consistency with the organizational identity perspective outlined in previous chapters.

4.2. Towards a categorization theory perspective on innovations

Organizations as categories of stimuli

Theorizing about categories can be traced back in philosophy as far as Aristotle (Ackrill, 1963). In current psychological scholarship, a wide range of different types of categories has been discussed, including goal-derived, taxonomic, formal, linguistic and ad hoc categories (Barsalou, 1983, 1985). Two types among them, that is, goal-derived and taxonomic categories, are of special relevance to the present conception of organizations. This study proposes that organizations display properties of both simultaneously, which is common to many categories (Barsalou, 1985).

Firstly, goal-derived categories are composed of stimuli that typically do not naturally co-occur in the environment, but that are cognitively related to each other and organized within a single category due to their pursuit of a common goal. For instance, the category of ‘things to take on a camping trip’ includes food, clothing and tools due to a common goal, not natural co-occurrence (Barsalou, 1985). Likewise, intraorganizational elements belong to a single organizational category, not primarily because they naturally co-occur, but because they are perceived to serve a common goal. For instance, in the present case of ‘HealthCo’, certain individuals and certain therapeutics do not somehow *naturally* co-occur in the environment. They are rather thought to belong to the ‘HealthCo’ category, because they jointly pursue ‘HealthCo’s’ vision, strategies and goals. Organizations thus display characteristics of goal-derived categories.

Secondly, taxonomic categories are categories that serve the cognitive classification of stimuli (Barsalou, 1985). Common examples for taxonomic categories include birds and vehicles, which serve to classify elements with certain features such as wings and beaks or tires and engines (Barsalou, 1985). Intraorganizational elements can clearly be classified by means of organizational categories. For instance, the category of ‘HealthCo’ enables classifying a therapeutic or a sales representative as belonging to the ‘HealthCo’ category when it shows certain ‘HealthCo’-related features. Without the availability of organizational-level categories, such a therapeutic or sales representative could not be classified as a ‘HealthCo therapeutic’, but would have to be categorized at a higher level of abstraction, for instance as a ‘pharmaceutical therapeutic’. As organizations serve to classify elements, they clearly display characteristics of taxonomic categories.

Prototypicality of organizational stimuli

Following standard categorization arguments (Fiske & Pavelchak, 1986), an organization is recognized as a category when its intraorganizational stimuli are perceived to be more similar to each other than to extra-category stimuli. While stimuli of a common category may be relatively similar to each other in comparison to outside stimuli, they internally differ as to how representative they are of the category (Rosch, 1975). Stimuli are thus said to have an internally graded structure according

to the degree of their category *prototypicality* (Barsalou, 1985; Mervis & Rosch, 1981; Rosch, 1973, 1975). This characteristic of graded structure appears to be a universal characteristic of categories (Rosch, 1973, 1978). When applying the principle of graded structure to organizations as cognitive categories, it follows that intraorganizational elements can be attributed a degree of prototypicality for the organization and for what it stands. This view is consistent with research, which has argued that an organization's identity can be represented in as diverse organizational elements as an organization's strategy (Ashforth & Mael, 1996), its strategic orientation (Nag et al., 2003), its set of product/market decisions (Kogut, 2000) or its actions in general (Santos & Eisenhardt, 2005). The present study extends this prior conceptual work by providing an in-depth theoretical explanation of the concept of prototypicality as applied to innovations as intraorganizational stimuli and explicitly testing its intraorganizational determinants and consequences. In order to do so, it first needs to be discussed which determinants drive the attribution of prototypicality to a category's stimuli.

Determinants of a stimulus' prototypicality

The degree to which a stimulus is regarded as prototypical for a category has been found to be determined by at least three different factors (Barsalou, 1985):

Firstly, a stimulus' *central tendency* within the category has been shown as a determinant of its degree of prototypicality (Rosch & Mervis, 1975). 'Central tendency' postulates that prototypicality of a stimulus will rise the more a stimulus is perceived to be similar to other stimuli of its category and dissimilar to stimuli of contrast categories. According to this principle, a prototype can be described as a central representation of a category holding the average or modal values of its attributes (Homa, 1984; Medin & Smith, 1984; Reed, 1972; Rosch, 1978).

Secondly, the degree of a stimulus' prototypicality can be determined by the stimulus' *similarity to an ideal* of a category (Barsalou, 1985). A prototype can thus be understood as an idealized representation of the focal category. Category ideals are here defined as "*characteristics that exemplars should have if they are to best serve a goal associated with their category*" (Barsalou, 1985) p.630). This conception (prototypicality as similarity to ideals) differs from the previous (prototypicality as

central tendency) in two important ways (Barsalou, 1985): First, ideals typically lie at the periphery, not at the centre, of a category. Hence, stimuli that are deemed similar to ideals tend towards extreme values, while stimuli matching central claims tend towards average values. Second, experience with real, existing category elements is needed in order to be able to form central tendency-derived prototypes. Ideal-derived prototypes, however, can be imagined and do not require experience with real elements.

Thirdly, *frequency of instantiation* and *familiarity* have been suggested to determine prototypicality (Barsalou, 1985). They are here summarized jointly for their definitional similarity. Frequency of instantiation has been defined as “*someone’s subjective estimate of how often they have experienced an entity as a member of a particular category*” ((Barsalou, 1985) p.631). Familiarity can be understood as “*someone’s subjective estimate of how often they have experienced an entity across all contexts*” ((Barsalou, 1985) p.631).

Of importance to the present study are Barsalou’s findings that prototypicality is not always driven by the same determinants (Barsalou, 1985). Rather, it depends on the type of category as to which determinant is relevant. Barsalou found that the determinants ‘similarity to ideals’ and ‘frequency of instantiation’ predicted stimulus prototypicality in both goal-derived and in taxonomic categories. The determinant ‘central tendency’ of a stimulus, however, was only predictive in taxonomic categories (Barsalou, 1985).

Having differentiated types of categories and related determinants of stimulus prototypicality in a general way, these insights are now specifically adapted and applied to organizations. It was previously developed that organizations can serve as both goal-derived and taxonomic cognitive categories. In consequence, all three determinants could be relevant drivers of the prototypicality of organizational stimuli. This study focuses primarily on the ‘similarity to ideals’ determinant, due to its overt conceptual fit with the organizational identity perspective: In an organizational context, ‘similarity to ideals’ can be easily equated with ‘similarity to the ideal organizational identity’, as the attributes of the ideal organizational identity match the prior definition of category ideals as “*characteristics that exemplars should have if*

they are to best serve a goal associated with their category" (Barsalou, 1985) p.630). Combining the above reasoning, an intraorganizational stimulus is expected to be attributed prototypicality for the organization to the extent it is perceived to match the ideal organizational identity (Foreman & Whetten, 2002; Reger et al., 1994).

Summing up, a novel perspective on organizations as cognitive categories has thus far been proposed and factors that determine the prototypicality of its elements have been derived. In view of parsimony and generalizability, intraorganizational stimuli have so far been treated uniformly and broadly. However, the present study is not interested in all types of organizational elements, but specifically in innovations. It thus remains to be established if innovative stimuli systematically differ from other stimuli. Before proceeding to such assessment, though, the following section seeks to ensure that the thoughts hitherto derived from categorization theory are commensurate with the social identity approach and its cognitive underpinning, SCT (Turner et al., 1987).

Self-categorization theory and this study's categorization perspective

SCT can be described along five major principles as a strand of the social identity approach (as detailed in chapter 2.2.3). In order to ensure compatibility of the present categorization approach with the social identity approach, it is examined whether each SCT principle is compatible with the present approach.

The first SCT principle addresses the process and object of categorization. While the self-concept is the object of categorization in SCT, any type of cognitive stimulus outside the self can be the object of categorization in the present approach. When applied to the organizational realm, SCT describes how individuals come to cognitively categorize themselves within organizations. In SCT, organizations are predominantly limited to their characteristic as a collective of individuals. The view that is adopted here, however, describes how individuals categorize intraorganizational stimuli in general. This approach is thus more inclusive of diverse intraorganizational elements than SCT, but compatible with the first principle.

The second principle of SCT, *functional antagonism*, suggests that self-categorization can occur at different hierarchical levels, with the salience of a certain category

attenuating the salience of other categories at higher or lower levels. This principle also applies when something other than the self is categorized. For instance, in rough analogy to the human, social and personal categorization levels in SCT, a therapeutic could be categorized in decreasing order of abstraction as a general product, a HealthCo therapeutic or as a specific molecule. Each categorization level makes a different set of category elements salient, thereby attenuating the salience of other categories.

The third and fourth principles of SCT are both related to the centrality of category stimuli. SCT suggests that categories are cognitively formed when a set of stimuli are perceived to be closer to each other than to other stimuli (*meta-contrast*) and that stimuli which are relatively central within the category will be seen as representative (*prototypicality*). Specifically, SCT understands category prototypes as “*fuzzy sets of interrelated attributes that simultaneously capture similarities and structural relationships within groups and differences between groups*” (Hogg et al., 2004) p.253). SCT thus appears to view categories primarily as classification devices (taxonomic categories) and to be predicated on the central tendency determinant. Accordingly, SCT views a category’s prototype as the representation of all attributes that structure and distinguish a category from others and thus accentuates its entitativity (Hogg & Terry, 2000). Still, SCT clearly recognizes that prototypes are not necessarily embodied by real, existing social objects, but also by abstract, ideal types, which may include beliefs, attitudes, feelings and behaviours (Hogg & Terry, 2000). The present approach adopts a more extended view by including the possibility of goal-derived categories and allowing for additional determinants of prototypicality such as similarity to ideals.

The fifth principle of SCT, *depersonalization*, describes the effect that individuals who categorize themselves with social groups start defining themselves in the terms of the group. They view themselves through the lens of the category. In analogy to depersonalization, members also start seeing individual intraorganizational elements through the category lens once they have categorized them. Put simply, HealthCo members will look at a new product differently once they have classified it as a HealthCo product. This process will be explained in more detail in the next chapter.

In conclusion, the present categorization approach is compatible to SCT and complements prior theoretical applications of SCT within the organizational realm. Essentially, both view organizations as cognitive categories whose elements possess a graded structure of prototypicality. While SCT has focussed on the self-concept and other individual members as category elements, the present approach puts forward that not only individuals, but also other organizational elements such as product innovations can be attributed a degree of prototypicality for their originating organization. This approach now allows for developing hypotheses regarding innovations as well as their antecedents and consequences from a categorization perspective.

4.3. Hypotheses: The mediating role of innovation prototypicality

4.3.1. Antecedents of innovation prototypicality

What role do innovations play in the present conception of organizations? In order to serve as a cognitive category, an organization must necessarily consist of relatively *similar* intraorganizational stimuli. How can innovations be integrated into this conception of similarity? Innovations were previously defined as “*the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, the organization or wider society*” ((West & Farr, 1990) p.9). Viewed from a categorization perspective, this definition postulates that innovative elements within an organizational category be, firstly, intentionally introduced and applicable, that they, secondly, be novel to the category and, thirdly, be of benefit to individuals or social collectives. It appears that among the three criteria, relative novelty (Anderson et al., 2004) truly differentiates innovative from non-innovative elements, because non-innovative elements can also be intentionally introduced, readily applicable and beneficial to individuals or social groups. Thus, relative novelty is focussed on as a key difference between innovative and non-innovative category elements. The postulate that an innovation be novel to the organization implies that it is recognized as differing from other stimuli which currently form the organizational category. Hence, innovative stimuli are understood from a categorization perspective as those intentionally introduced, readily applicable and

beneficial intraorganizational stimuli that members do not immediately recognize as similar to *current* intraorganizational stimuli, but initially perceive as different and novel in kind. This conception of innovations as initially dissimilar intraorganizational stimuli is concordant with other views outside categorization theory and SCT which describe innovations as disruptions in the construction and maintenance of identities (King, 2003) or as social restructurings that are associated with changes in cognitions, perceptions, expectations and behavioural repertoires (Anderson et al., 2004).

Such innovative disturbances trigger interpretation through sensemaking, because they cause the perceived current and expected states of the world to fall apart (Weick, 1995; Weick et al., 2005). Sensemaking means that “*a flow of organizational circumstances is turned into words and salient categories*” ((Weick et al., 2005) p.409). Through this sensemaking process, meaning is attached to the innovations (Daft & Weick, 1984). Dutton and Jackson have shown that the interpretation and the attribution of meaning to intraorganizational stimuli, such as strategic issues, is guided by the categories that are employed in the interpretation processes (Dutton & Jackson, 1987). Organizational identity has been argued to have a powerful influence on interpretation in sensemaking processes (Weick et al., 2005). This study builds on these insights and postulates that members will interpret and attribute meaning to innovations through the lens of the category to which they are added, that is, the organization. More precisely, the lens through which interpretation occurs will be the member’s perception of the category ideal or prototype, that is, the ideal organizational identity. If the innovation is ultimately recognized to be highly similar to the prototype as a result of the sensemaking process, the innovation will be seen as highly prototypical for the organization. It is important to note that once a stimulus has been categorized, it is schematically represented in memory by a simplified image which is more similar to the prototype than the original stimulus (Alba & Hasher, 1983). This means that once a member has completed interpreting and integrating the innovation stimulus into his memory scheme, he will not have memorized a representation of all the innovation’s ‘objective’ attributes, but rather a selective image that consists of simplified beliefs about the innovation, including the innovation’s relationship to the ideal organizational identity. Organizational members will thus recognize an innovation as highly prototypical for the organization when the

image of the innovation that they created through sensemaking matches their image of the ideal organizational identity ('this innovation represents who we want to be'). As was argued in chapter 3, the ideal organizational identity is the organizational identity that best meets members' social identity motives. It is, then, proposed that innovations will be awarded a high degree of prototypicality when they enhance current organizational identity in dimensions which are relevant to a positive social identity of the member. As shown in chapter 3, a member's positive social identity is driven by self-distinctiveness, self-continuity and self-enhancement motives. These identity motives are supported when an innovation increases organizational distinctiveness, organizational congruence and organizational prestige. In conclusion, a high degree of prototypicality will be attributed to innovations when they are perceived to raise organizational distinctiveness or prestige. A lower degree of prototypicality will be attributed to innovations when they are perceived to increase organizational incongruence.

Hypothesis 4a-c (H4a-c):

The more an organizational member perceives an innovation to increase the a) distinctiveness, b) incongruence, c) prestige of an organization, the a) more, b) less, c) more he will view it as prototypical for the organization.

4.3.2. Consequences of innovation prototypicality

The degree of prototypicality of a category element has been shown to facilitate performance of a variety of different psychological processes at the individual level (Rosch, 1978) and it has been demonstrated that individuals approach highly prototypical elements more favourably than less prototypical elements (Loken, 2006; Loken & Ward, 1990; Martindale & Moore, 1988; Veryzer & Hutchinson, 1998). As the psychological process of interest in this study is the organizational members' identification with innovations, it is subsequently attempted to explore the influence an innovation's prototypicality may exert on members' identification with it. A member's identification with an innovation was previously described as the degree to which he defines himself by the same attributes as he defines the innovation. Identification with an innovation was thus specified as the degree of perceived

overlap between an individual's social identity as an organizational member and his image of the innovation (see chapter 3.2.1.).

Here is where innovation prototypicality comes into perspective. Innovations have previously been argued to be attributed a certain degree of prototypicality according to their perceived similarity with the ideal organizational identity. The more similar a member's image of an innovation is to his image of the ideal organizational identity, the more similar the innovation will also appear to his social identity as an organizational member. For instance, if it is true that a certain innovation represents best 'who HealthCo should be and stand for' (ideal organizational identity), it will also be true that this innovation represents best 'who I want to be and stand for as a HealthCo member' (social identity). In such instances, the member's image of the innovation will then exhibit a large overlap with his social identity, which is equivalent to a strong identification with the innovation. Thus, the degree of prototypicality that an organizational member attributes to an innovation is expected to predict the extent to which he identifies with it. In summary, when organizational membership is salient, organizational members will identify with an innovation to the extent it is attributed a high degree of prototypicality for the organization. They will identify with the innovation because they will perceive it to largely overlap with their social identity.

Hypothesis 5 (H5):

The more an organizational member perceives an innovation to be prototypical for the organization, the more he will identify with the innovation.

4.3.3. Mediating effect of innovation prototypicality

A mediator represents the generative mechanism through which an independent variable is able to influence a dependent variable of interest (Baron & Kenny, 1986). As such, it decomposes the effects that independent and mediator variables have on the dependent variable and thereby explains why such effects occur (Baron & Kenny, 1986). This chapter's theoretical reasoning has focussed on the psychological mechanisms that generate the direct effects between the independent and dependent variables explained and tested in chapter 3. The degree of prototypicality that is attributed to an innovation as a result of members' sensemaking processes

has been proposed as a mediator: Prototypicality explains why and to what extent members will identify with an innovation when they view it as modifying the organization's current identity. Briefly repeated, the reason that members identify with an innovation which enhances the current organizational identity is that members perceive such innovations as highly prototypical for the organization ('this innovation represents who we want to be as an organization') and, thereby, highly congruent with their own social identity as organizational members ('this innovation represents who I am and stand for as a member of this organization'). As this mediating principle applies to the member's social identity as a whole, it is also applicable to any of its sub-dimensions or motives. Thus, whenever a member perceives an innovation to impact the current organizational identity in a way that enhances his self-distinctiveness, self-continuity and self-enhancement, he will attribute a relatively high degree of prototypicality to the innovation and identify strongly with it. In consequence, all three antecedents that were developed in chapter 3 are expected to be fully mediated by an innovation's prototypicality.

Hypothesis 6 (H6):

Innovation prototypicality fully mediates the relationship between a member's perceptions of the innovation's organizational identity effects and his identification with the innovation.

Figure 4.1. integrates the hypotheses developed above and depicts the proposed theoretical model.

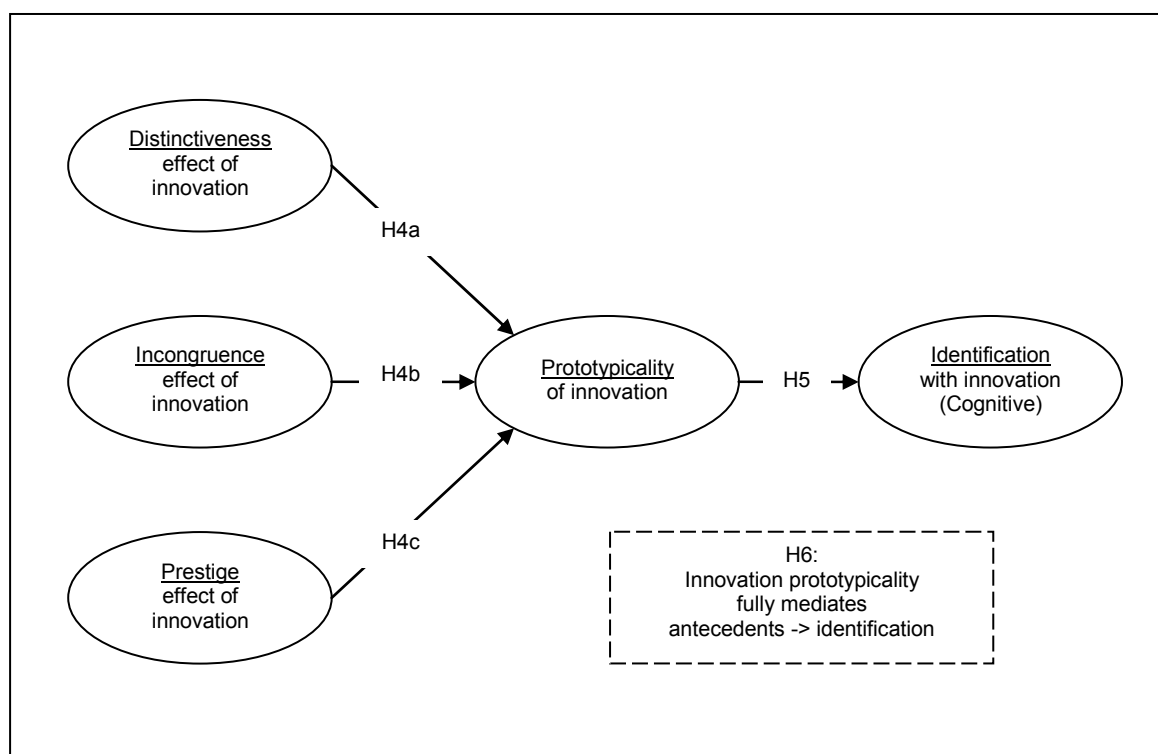


Figure 4.1: Hypothesized mediation model of innovation prototypicality

4.3.4. Innovation prototypicality over time and across social contexts

It has been argued above that sensemaking processes are involved in interpreting an innovation and imbuing it with a certain degree of prototypicality. These processes take time to unfold (Weick, 1995). Also, evaluative processes related to social identity have been shown to be highly dependent on social context (see chapter 2.2.2.). Depending on the development stage of an innovation, both the time during which sensemaking regarding the innovation is taking place and the social context within which sensemaking occurs may vary significantly. It would therefore be of special interest to further investigate if the mediating effect of innovation prototypicality is applicable across different durations and social contexts of sensemaking. For a theoretical assessment of the potential impact that duration and social context of sensemaking could have within our theoretical model, a closer examination of the concept of sensemaking is indispensable.

Sensemaking theorists have recently recast the concept in the terms of Campbell's evolutionary epistemology (Campbell, 1969), suggesting that a sensemaking process involves three steps (Weick et al., 2005): The first step of *enactment* "incorporates

the sensemaking activities of noticing and bracketing. These activities of noticing and bracketing, triggered by discrepancies and equivocality in ongoing projects, begin to change the flux of circumstances into the orderliness of situations" ((Weick et al., 2005) p.414). Noticing and bracketing thus can be understood as first acts of categorizing discrepant stimuli. In the following step of *selection*, the bracketed material gets reduced and condensed by means of retrospective attention, mental models and articulation into a plausible, but still tentative, story. In the final step of *retention*, selected stories gain solidity when they match experiences and identities. In summary, sensemaking can be described as involving "*the ongoing retrospective development of plausible images*" ((Weick et al., 2005) p.409) that rationalizes the actions of social entities.

This conceptual background is now applied to assess which effect the *duration* of a sensemaking process may have. Sensemaking is expected to start as soon as a stimulus is noticed that does not seem to fit the current set of stimuli within a category, such as in the instance of an innovation that is introduced to an organization. A first and rough categorization immediately takes place via bracketing. Plausible narratives are created and selected to make sense of the innovation. Thus, organizational members will create images of an innovation via sensemaking as soon as it comes to their attention. These images are then refined, solidified and thereby retained over time. Two conclusions emerge. Firstly, it appears that members will have an opinion about the innovation's prototypicality at any stage of the innovation development process, irrespective of the elapsed time of sensemaking. The members' opinions may be tentative in early stages, but will nevertheless be present and measurable early on as a result of initial sensemaking. Secondly, the content of the innovation's image, including its attributed degree of prototypicality for the organization, may change over time, as the image becomes refined and more substantiated during the retention stage of sensemaking.

As regards the impact of differing *social contexts* along the innovation development process, two means by which they exert influence can be recognized. Firstly, changing social contexts directly impact sensemaking by offering the opportunity for including more diverse perspectives, which may help to stabilize plausible and destabilize implausible narratives concerning the innovation. Secondly, social

contexts also indirectly impact sensemaking. Feedback from the social context on the organizational actions has a strong impact on members' images of the innovation and their perceptions of how it is changing the organization's identity. This finds its expression in the sensemaking recipe "*how can I know who we are becoming until I see what they say and do with our actions?*" ((Weick et al., 2005) p.416). However, feedback from the social context is not necessarily a prerequisite for identity construction and sensemaking. Also without any explicit feedback from the social context individuals construe expectations about how the environment will receive their actions (Gioia et al., 2000). Taken together, diversity in social context is expected not to inhibit, but to support sensemaking, especially in the retention stage. Similarly to the influence of duration, changes in social contexts certainly impact the content of sensemaking but are not inhibitory to the process.

Again, two conclusions emerge. Firstly, members are expected to have a, possibly tentative, opinion on the innovation's prototypicality at any stage of the innovation development process, irrespective of its social context. Secondly, the content of the innovation's image, including its attributed degree of prototypicality, may become more refined and solidified with changing and more diverse social contexts. In summary, an innovation will be recognized as highly prototypical for the organization when its introduction is perceived to enhance current organizational identity in those dimensions that are relevant for a positive social identity of the member, irrespective of the innovation's development stage (duration / social context). Nevertheless, in order to provide evidence for the context-independent validity of the hypotheses and their related findings, two different studies were performed, each focussing on an innovation in a different development stage that represented different durations and social contexts of sensemaking.

4.4. Methods

4.4.1. Sample and survey

The hypothesized relationships were assessed on the basis of the same data as the previous models. Additional variables were collected at the same time and by means of the same questionnaire instrument (for further details, see chapter 3.3.1.).

4.4.2. Measures and model

Innovation prototypicality

Innovation prototypicality was captured by a new scale consisting of three items. All three items were formulated in concordance with the well-established approach to measure prototypicality as goodness-of-example judgements of category exemplars (Rosch, 1975). The first item was based on Rosch's established single-item measure, asking for a straightforward, global judgement of the prototypicality of the category exemplar (Hampton, 1997; Rosch, 1975). In adaptation to our empirical setting, respondents were asked to rate on a 5-point scale to what extent they thought different innovations were highly typical of HealthCo. The scale was anchored by strongly agree/disagree poles. In order to more specifically capture the domain of the prototypicality concept for content validity (Churchill, 1979), two more items were included. They were based on the previously described insights from categorization theory that prototypicality of category elements can be determined by assessing their similarity to category ideals (Barsalou, 1985). In adaptation to our setting, respondents were asked to what extent their image of the innovation matched HealthCo's deeply rooted ideals and values. However, it was recognized that this item's focus on ideals and values may induce and possibly constrain members to an assessment of purely *internal* aspects of the idealized organizational identity. Internal aspects may not comprehensively cover the construct's domain, because idealized perceptions of organizational identity certainly also include expectations about positive *external* assessments (Gioia et al., 2000; Gioia & Thomas, 1996). In consequence, a third item was developed that broadly gauges organizational ideals from a (construed) *external* perspective. Respondents were asked to rate to what extent their image of the innovation matched a trustworthy, construed external image (CEI) of HealthCo.

As cognitive processes of individual organizational members were the object of analysis, the research interest lay in each individual as a single source. Variables of interest thus could, by definition, not be sourced from different respondents. Observing recommendations from Podsakoff (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), methodological safeguards were applied to ensure that results were not merely due to common source bias. Firstly, methodological separation of measures was aimed at by using different types of scales: verbal and visual. Secondly, psychological separation was pursued by inserting small texts or other, unrelated variables between antecedent, mediating and outcome variables. Thirdly, item order was counterbalanced by switching the order of the mediating variable and the outcome variable such that the respondents did not cognitively process the items in the antecedent – mediator – outcome order.

Reliabilities of the prototypicality measures were tested separately for both datasets covering Inno1 and Inno2. Coefficient alphas reached acceptable levels (Nunnally, 1992) with .77 for Inno1 and .83 for Inno2. In both cases, the analyses also revealed that by excluding the first item, alphas could be raised to .85 for Inno1 and .89 for Inno2. It was decided to preliminarily keep the complete set of items for content validity reasons (Churchill, 1979; Hair et al., 2006).

Convergent and discriminant validity of the prototypicality measure were assessed for both datasets by means of confirmatory factor analyses (CFA) of the complete structural model based on maximum likelihood estimation. As some data points were missing within the dataset, full information likelihood estimation (FIML)(Arbuckle, 1996) was used, which has been shown to be superior to listwise deletion, pairwise deletion or mean substitution methods for dealing with missing data (Enders & Bandalos, 2001; Wothke, 2000).

Maximum likelihood estimation is generally stated to require large samples, indicators with multivariate normal distributions, valid model specification and continuous interval-level variables (Hair et al., 2006). The present dataset with a sample size of approximately $n=154$ satisfies standard sample size recommendations (Hoyle, 1995; Loehlin, 1992). As much of the indicator data was acquired by means of Likert

scales, it is ordinal in nature and may at first sight seem potentially unfit for maximum likelihood estimation. It is generally agreed and has been shown, though, that ordinal data can be treated as continuous interval-level data without the risk of biasing model fit indices as long there are at least five ordered categories and the ordinal data is approximately normally distributed (Babakus, Ferguson, & Jöreskog, 1987; Bollen, 1989; Muthén & Kaplan, 1985). This was given in the present data because, firstly, all observed variables were measured on scales with at least five categories and secondly, skew and kurtosis of the indicator variables did not exceed the threshold of +/- 1.5 for all variables signalling no severe departure from normality (Schumacker & Lomax, 2004).

For the data on Inno1, absolute and incremental global indices showed a good fit with $\chi^2/df=1.34$ ($p=.01$), RMSEA=.05, CFI=.98, TLI=.97 and NFI=.93. Partial fit indices also evidenced good fit with a single exception. Indicator reliabilities (IR) were well beyond the recommended threshold of .40 for all items except for the first item of prototypicality, which only reached an indicator reliability of .28. Although an IR level beyond .20 has sometimes been deemed as appropriate (Peter, 1979), this was interpreted as another sign that the first item may be a source of weak convergent validity. Construct reliabilities (CR) exceeded .70 for all constructs as recommended (Nunnally, 1992). Also, average variance extracted (AVE) was higher than .50 for all constructs, but comparatively low for the prototypicality construct in reaching only .58. This low level of AVE proved to create a difficulty when attempting to establish discriminant validity via the Fornell-Larcker criterion. The Fornell-Larcker-Ratio exceeded its recommended maximum score and reached 1.08 when comparing the construct's AVE and its highest intercorrelation (with identity incongruence effect). The high degree of intercorrelation did not come as a surprise, because the hypothesized model represents a cognitive process that is – by its very nature – expected to be composed of highly interrelated constructs. In order to strengthen convergent and discriminant validity, though, it was decided to drop the first prototypicality item.

Another CFA was performed with the optimized item set, which evidenced that eliminating the item significantly enhanced construct validity. Absolute and incremental global indices reflected this better fit with $\chi^2/df=1.27$ ($p=.05$),

RMSEA<.05, CFI=.99, TLI=.98 and NFI=.94. More importantly, partial indices now all achieved acceptable levels with prototypicality's AVE rising from .58 to .72, and the construct's Fornell-Larcker-Ratio falling to an acceptable level of .85.

Repeating the same CFA with the second dataset covering Inno2 largely confirmed the above findings regarding an appropriate measurement model for innovation prototypicality. Assessing prototypicality including the first global item led to an acceptable global fit with $\chi^2/df=1.40$ ($p=0.005$), RMSEA=.05, CFI=.98, TLI=.97 and NFI=.94. But indicator reliability was again relatively low for the first prototypicality item with .38, while the IRs for all other items reached or exceeded .50. AVE was also comparatively low for prototypicality with .68, and the Fornell-Larcker-Ratio of .71 for the prototypicality construct turned out as the highest among all constructs when including the first item. As in the case of Inno1, these results clearly indicated the potential to enhance convergent and discriminant validity by excluding the first item of the prototypicality measure. Another CFA was performed without the first prototypicality item. The optimized model led to excellent absolute and incremental global fit indices with $\chi^2/df=.98$ ($p=.53$), RMSEA=.00, CFI=1.00, TLI=1.00 and NFI=.96. Also, previously critical indices were enhanced with prototypicality's AVE reaching .81 and its corresponding Fornell-Larcker-Ratio falling to .57.

One reason for the weak measurement properties of the first prototypicality item may have been ambiguity in wording. The item simply asked to rate to what extent the participants agreed to the phrase “[*This innovation*] is highly typical for HealthCo”. In doing so, the item did not differentiate ideal from current organizational identity. While interviews and pre-tests had led to confidence that members were thinking of their organizational ideal when responding to this item, its wording did not explicitly prime the ideal organizational identity. Thus, some respondents may have experienced a certain degree of ambiguity when answering this question whether current or ideal perceptions of the organizational identity were meant. This may have led to its weak contribution to the convergent and discriminant validity of the construct. If this assessment is correct, excluding the item not only strengthened the convergent and discriminant, but also the content validity of the construct. In summary, a novel measure of the prototypicality of innovations for ideal organizational identity was

developed and its reliability, convergent and discriminant validity was shown based on two different datasets.

Controls

Control variables that had previously been found to have a significant effect on members' identification with the innovation were also included. These were the members' age and their organizational tenure (see chapter 3.4.). As age and tenure are not independent and were found to be highly correlated, they were allowed to freely covary in the structural model. While some have dealt with the intercorrelation of age and tenure by creating an aggregated 'age-tenure' variable (Bordia & Blau, 1998, 2003), both variables were here consciously kept separate, because previous findings had indicated that they have opposite relationships with the dependent variable (see chapter 3.4.). Aggregating age and tenure would thus have masked these important differences.

Mediation analysis

Baron and Kenny recommend using structural equation modelling (SEM) when the mediator is an internal psychological variable that is measured with error (Baron & Kenny, 1986). They point out that SEM is advantageous over alternative methods because it allows to directly test all relevant paths and to incorporate complications of measurement error, correlated measurement error or feedback directly into the model (Baron & Kenny, 1986). Three different models were created and compared with each other in order to establish the mediating effect of innovation prototypicality (Kelloway, 1995, 1998): The first model represented the hypothesized, full mediation model. The second, partial mediation model included three additional paths linking the independent variables directly with the dependent variable. For the third, non-mediation model, the path leading from prototypicality to identification with the innovation was dropped, while retaining all other specifications of the partial mediation model. The same models were applied to both innovations (Inno1 / Inno2) and assessed using full information maximum likelihood estimation (FIML) as implemented in the AMOS 6.0 software (Arbuckle, 1996).

4.5. Results

4.5.1. Study 1

The first study assessed the mediating effect of innovation prototypicality for the innovation that had already been launched (Inno1) (see chapter 3.3.). Corresponding descriptive statistics, including means, standard deviations and correlations for all variables, are provided in table 4.1.

Variables	Mean	s.d.	1	2	3	4	5	6	7
1. Identification with Innovation (1)	5.83	1.31	(.93)						
2. Age	4.94	1.88	-.02	-					
3. Tenure	8.06	6.54	-.15 [†]	.75 ^{***}	-				
4. Prototypicality Innovation (1)	3.70	1.00	.74 ^{***}	-.13	-.15 [†]	(.85)			
5. Distinctiveness effect of Innovation (1)	3.06	1.03	.53 ^{***}	-.05	-.10	.67 ^{***}	(.96)		
6. Incongruence effect of Innovation (1)	2.44	1.08	-.58 ^{***}	.19 [*]	.21 ^{**}	-.78 ^{***}	-.58 ^{***}	(.88)	
7. Prestige effect of Innovation (1)	3.62	.88	.58 ^{***}	-.01	-.06	.63 ^{***}	.51 ^{***}	-.44 ^{***}	(.91)

n=154. Reliability measures (Cronbach's alpha) are on the diagonal.

[†] $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Table 4.1: Descriptive statistics and correlations (Inno1)

Results indicated a good fit for the hypothesized, fully-mediated model with $\chi^2/df=1.23$ ($p=.07$), RMSEA=.04, CFI=.99, TLI=.98 and NFI=.94. All three

hypotheses relating to the antecedents of innovation prototypicality (H4a-c) were supported by significant path coefficients ($p < .01$).

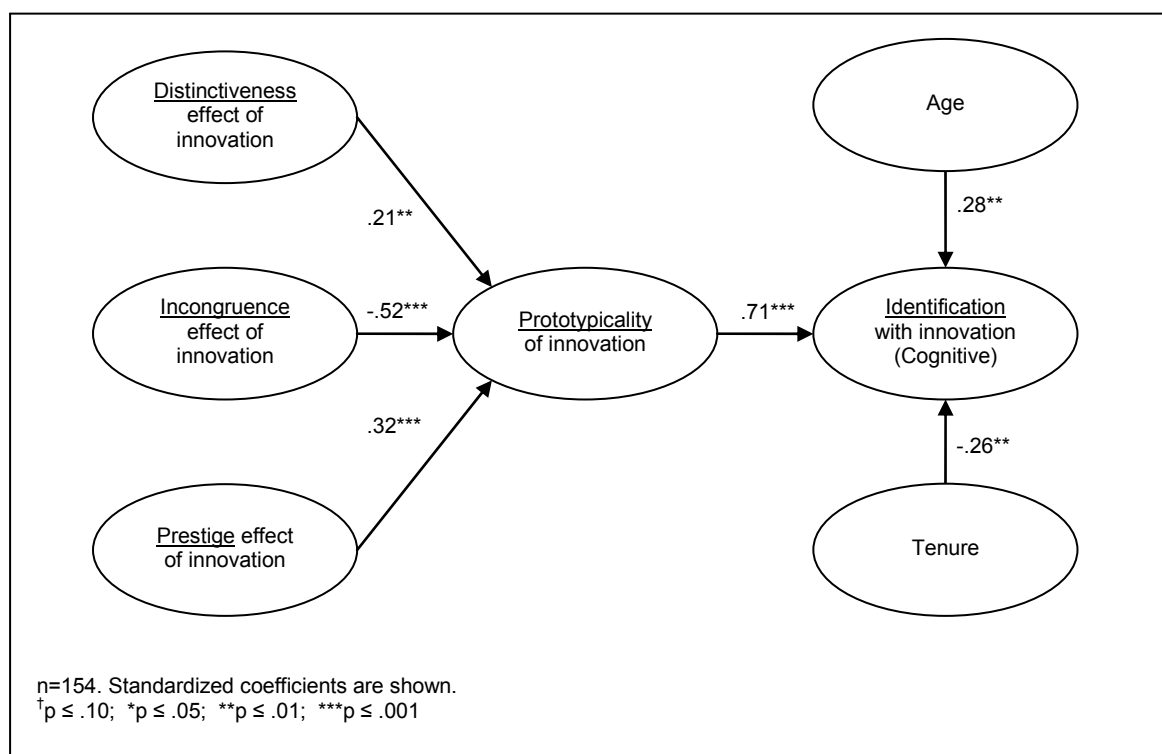


Figure 4.2: Full mediation model (hypothesized) (Inno1)

When comparing standardized coefficients, an interesting finding emerged. The perceived incongruence effect of Inno1 was the strongest predictor for the innovation’s prototypicality ($\gamma = -.52$, $p < .001$) and clearly exceeded the impact of the perceived prestige effect ($\gamma = .32$, $p < .001$). This finding somewhat differed from earlier unmediated results (see chapter 3.4.), where the prestige effect was the strongest determinant of members’ identification with the innovation. Taken together, this was interpreted as a first indication that prototypicality may mediate perceptions of prestige to a lesser extent than perceptions of incongruence. Hypothesis 5 also found strong support. When the innovation was perceived to be more prototypical for the organization, members tended to identify more strongly with it ($p < .001$).

As laid out above, additional models were assessed for testing the mediation hypothesis (H6). The partial mediation model fit the data well with $\chi^2/df = 1.23$ ($p = .07$), RMSEA = .04, CFI = .99, TLI = .98 and NFI = .94, but did not lead to a notable

improvement over the hypothesized, full mediation model, as the difference in chi-square of both models was not significant ($\chi^2_{df=3}=3.17$, $p=.37$). Also, no coefficients of the additional direct paths reached significance, while all indirect path coefficients of the hypothesized model remained significant ($p<.01$).

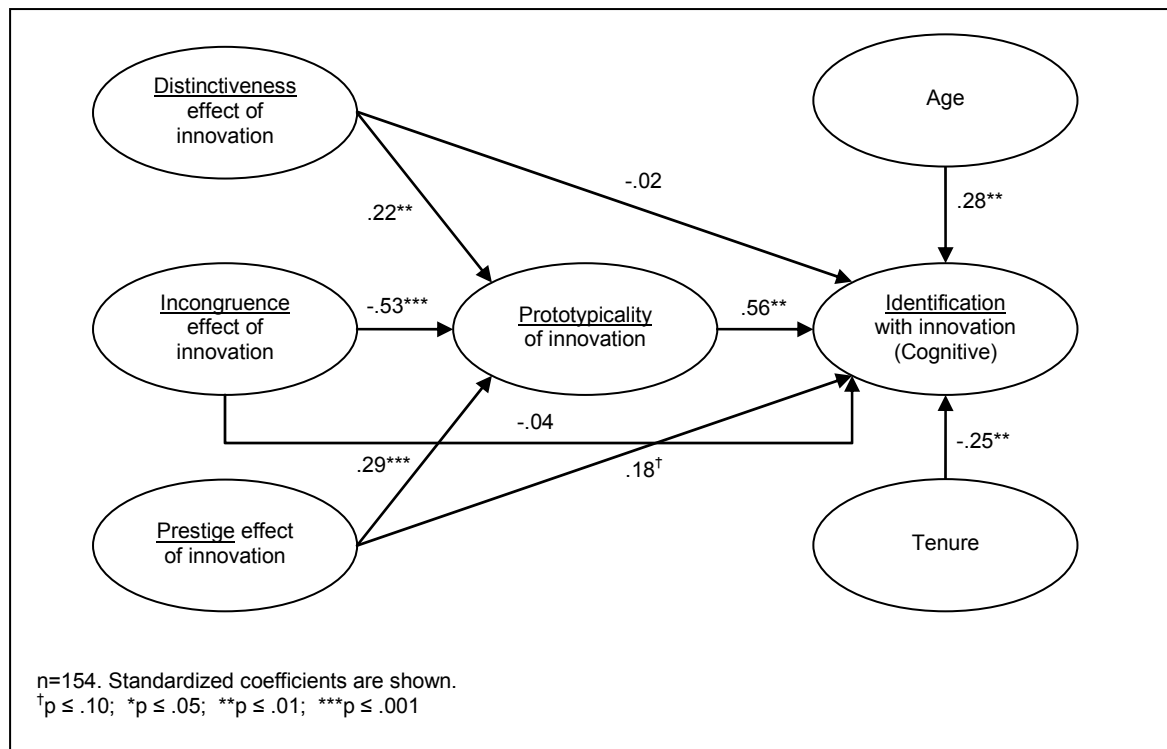


Figure 4.3: Partial mediation model (Inno1)

It should be noted, though, that the direct path from prestige to identification with the innovation only barely missed conventional significance levels ($p=.06$), while the other direct paths from distinctiveness effects and incongruence effects were far from reaching significance with ($p=.87$) and ($p=.75$), respectively. When considering the standardized total effects, prestige (.34) was as strong a predictor of members' identification with the innovation as incongruence (-.34) and exceeded the standardized total effect of distinctiveness (.11). Including the direct path thus re-established consistency with findings from the unmediated OLS regression models in chapter 3.4., where the prestige effect was most predictive of members' identification with the innovation.

In order to assess the potential partial mediation of the prestige path, another partial mediation model was assessed that included only one direct path, from prestige to identification with the innovation.

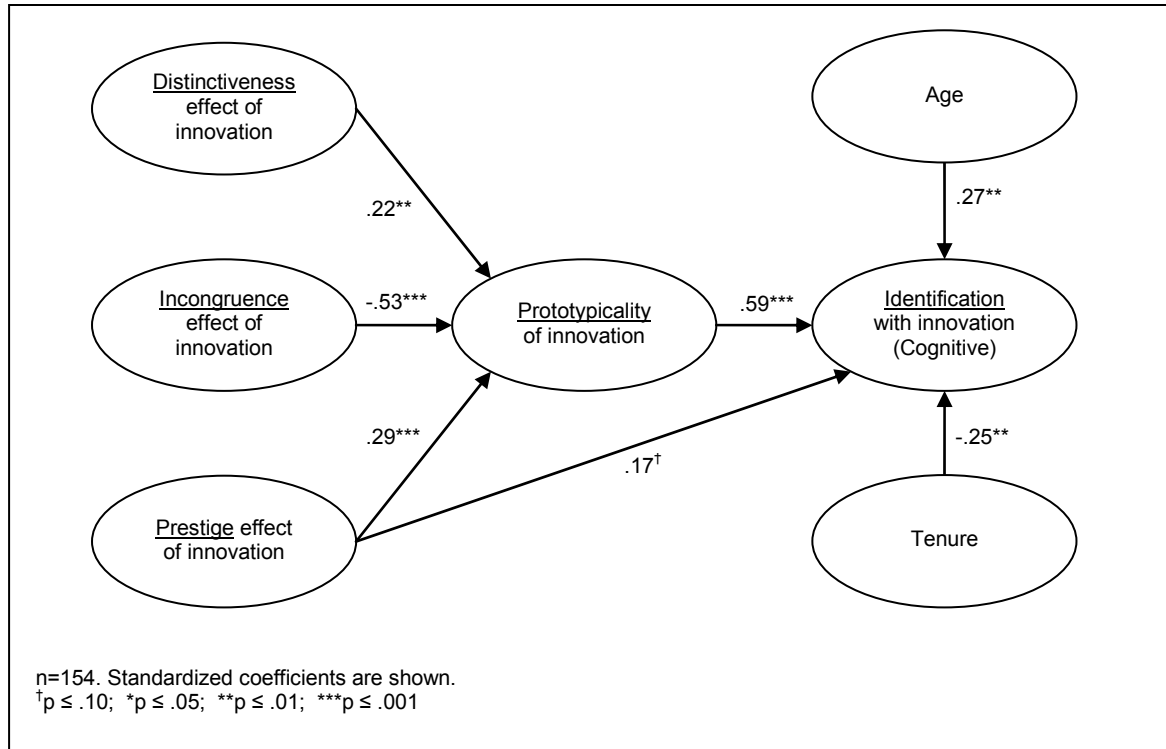


Figure 4.4: Limited partial mediation model (prestige only) (Inno1)

With $\chi^2/df=1.21$ ($p=.08$), RMSEA=.04, CFI=.99, TLI=.98 and NFI=.94, the resulting fit represented only a minor improvement of the hypothesized model. A direct comparison of both models showed that the improvement in chi-square was not significant with $\chi^2_{df}=3.17$, $df=3$ ($p=.37$).

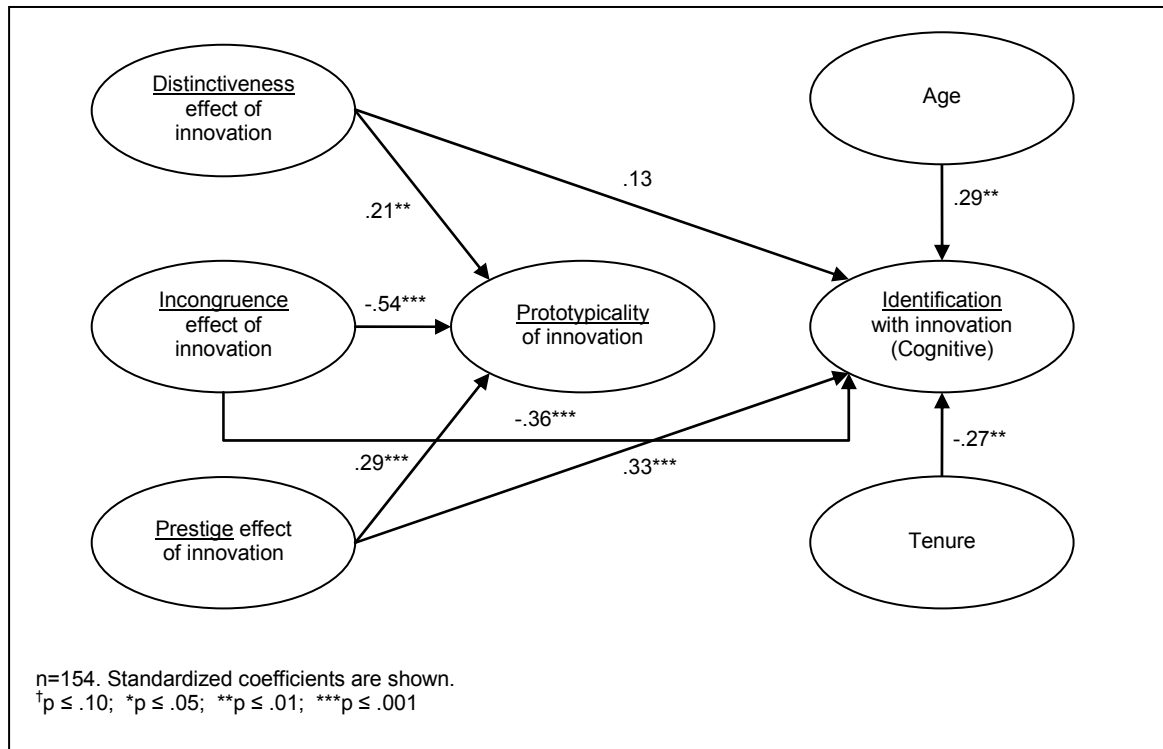


Figure 4.5: Non-mediation model (Inno1)

The non-mediation model yielded an acceptable fit with $\chi^2/df=1.32$ ($p=.02$), RMSEA=.05, CFI=.98, TLI=.98 and NFI=.94. In comparison to the hypothesized, full mediation model, though, the non-mediation model yielded a significantly worse fit ($\chi^2_{df}=6.32$, $df=2$, $p<.05$).

Thus, when examining global model fit, neither the partial mediation model nor the non-mediation model was superior to the hypothesized, full mediation model. Finally, the path coefficients and their significance were examined regarding the three conditions that are commonly required for mediation (Baron & Kenny, 1986; MacKinnon et al., 2002). In fulfilment of the first condition, the mediator was significantly related to each of the independent variables in all models. As demanded by the second condition, the dependent variable was also significantly associated with two of the independent variables, the incongruence and prestige effects (see figure 4.5.). However, the third independent variable, the distinctiveness effect, was not significantly related to the independent variable ($p=.16$). Still, recent studies have argued and shown that mediation can be present, even when the second condition is not met (Preacher & Hayes, 2004; Shrout & Bolger, 2002). Mediation may be present in cases where there is a direct effect (non-zero coefficient) and where the indirect

effect is statistically significant in the predicted direction (Preacher & Hayes, 2004). Both requirements were met here, because the standardized regression coefficient was different from zero ($\gamma=.13$) and Sobel's test (Sobel, 1982) indicated a significant indirect effect of distinctiveness ($p<.05$). The third condition for mediation asks for insignificant coefficients when the dependent variable is regressed on both independent and mediator variables. A comparison of figures 4.5. and 4.3. shows that the effect of the independent variables is strongly reduced when controlling for the mediator (figure 4.3.). Including the mediator leads to very weak and insignificant direct path coefficients for the distinctiveness ($\gamma=-.02$, $p=.87$) and the incongruence effect ($\gamma=-.04$, $p=.75$), while the prestige effect retains a weak and barely significant direct relationship with identification with innovation ($\gamma=.18$, $p=.06$). Thus, the full mediation hypothesis (H6) was supported.

In all three models (fully mediated / partially mediated / non-mediated), the controls were significantly related to identification with the innovation, but in opposite directions. Increases in age of the responding member were associated with a higher identification with Inno1 ($p<.01$), while increasing organizational tenure was related to lower levels of identification with Inno1 ($p<.01$). This corroborates the unsuspected findings of opposite influences of age and tenure from the unmediated OLS regression analyses in chapter 3.4.

Finally, in order to ensure that data imputation by the FIML process had not induced biased results, all three different models were re-run after listwise deletion of cases with missing data. Single data points were missing in about 8% of the cases, and so listwise deletion led to a reduced total sample of $n=142$. Results for all models based on this smaller, but complete, dataset confirmed the above findings.

In conclusion, all results provided comprehensive support for hypotheses 4a-c, 5 and 6. An innovation's prototypicality mediated the impact that perceptions of innovation-induced changes in organizational distinctiveness, incongruence and prestige had on members' identification with the innovation. While mediation was complete for distinctiveness and incongruence, prestige perceptions appeared to partially impact

identification directly. Before these findings are discussed in further details, the results from the second study are presented.

4.5.2. Study 2

The second study was performed with two goals in mind. Firstly, it was aimed at replicating the previous analysis, thereby offering a stronger test of the proposed theory. Study 2 was based on another innovation (Inno2) of HealthCo, which differed from the previous innovation (Inno1) in its development stage: While Inno1 had already been externally launched, Inno2 was still largely under internal development (for more details, see chapter 3.3). The different development stages of both innovations meant that the workforce had been making sense of these innovations within different social contexts and for different durations. Hence, performing this study served, secondly, as an exploratory test that the proposed theory is independent of sensemaking context and duration. Commensurate with the first study, three models were constructed. First, the hypothesized, full mediation model was calculated. Then, the partial mediation and the non-mediation models were compared to the hypothesized model, in order to assess the validity of the mediating effect (Kelloway, 1995, 1998). Finally, the three mediation conditions proposed by Baron and Kenny were assessed (Baron & Kenny, 1986). Descriptive statistics and correlations for the analyses of Inno2 are provided in table 4.2. below.

Variables	Mean	s.d.	1	2	3	4	5	6	7
1. Identification with Innovation (2)	5.82	1.79	(.93)						
2. Age	4.94	1.88	-.11	-					
3. Tenure	8.06	6.54	-.15 [†]	.76 ^{***}	-				
4. Prototypicality of Innovation (2)	3.27	1.25	.70 ^{***}	.00	-.01	(.89)			
5. Distinctiveness effect of Innovation (2)	2.64	1.27	.52 ^{***}	.00	-.05	.65 ^{***}	(.96)		
6. Incongruence effect of Innovation (2)	2.91	1.22	-.52 ^{***}	-.14 [†]	-.02	-.64 ^{***}	-.52 ^{***}	(.88)	
7. Prestige effect of Innovation (2)	4.00	.91	.57 ^{***}	-.12	-.07	.57 ^{***}	.38 ^{***}	-.24 ^{**}	(.91)

n=154. Reliability measures (Cronbach's alpha) are on the diagonal.

[†]p ≤ .10; *p ≤ .05; **p ≤ .01; ***p ≤ .001

Table 4.2: Descriptive statistics and correlations (Inno2)

The hypothesized, full mediation model (see figure 4.6.) manifested a good fit with $\chi^2/df=1.11$ ($p=.21$), RMSEA=.03, CFI=.99, TLI=.99 and NFI=.95. All hypothesized

path coefficients were highly significant ($p < .001$). In contrast to the prior studies on Inno1, however, both controls (age, tenure) did not reach significance as predictors of members' identification with Inno2.

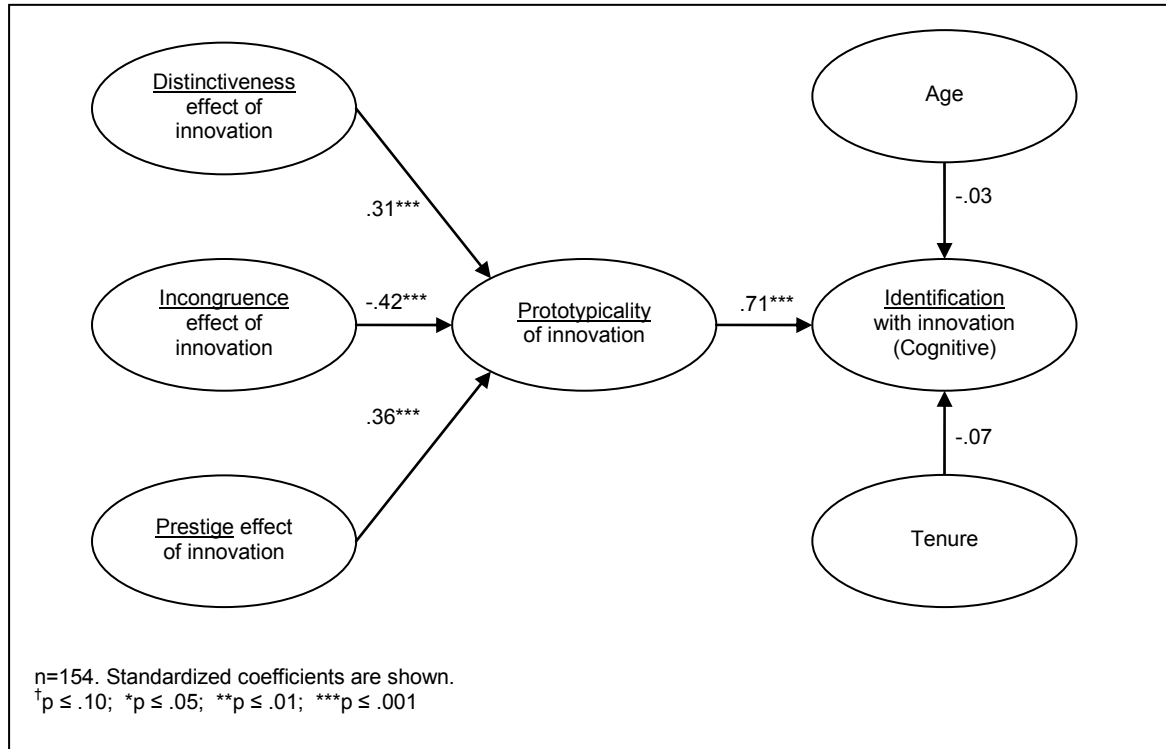


Figure 4.6: Full mediation model (hypothesized) (Inno2)

The partial mediation model exhibited an excellent fit with $\chi^2/df=1.02$ ($p=.43$), RMSEA=.01, CFI=1.00, TLI=1.00 and NFI=.95. In comparison with the full mediation model, adding direct paths led to a significant improvement in chi-square ($\chi^2_{df}=12.18$, $df=3$, $p < .01$), signalling a better fit. Not only did all hypothesized *indirect* path coefficients remain significant ($p < .01$), but also the *direct* path from prestige to identification achieved high significance levels ($p < .001$), and the direct path from incongruence to identification came very close to conventional significance levels ($p=.07$). Controls remained insignificant.

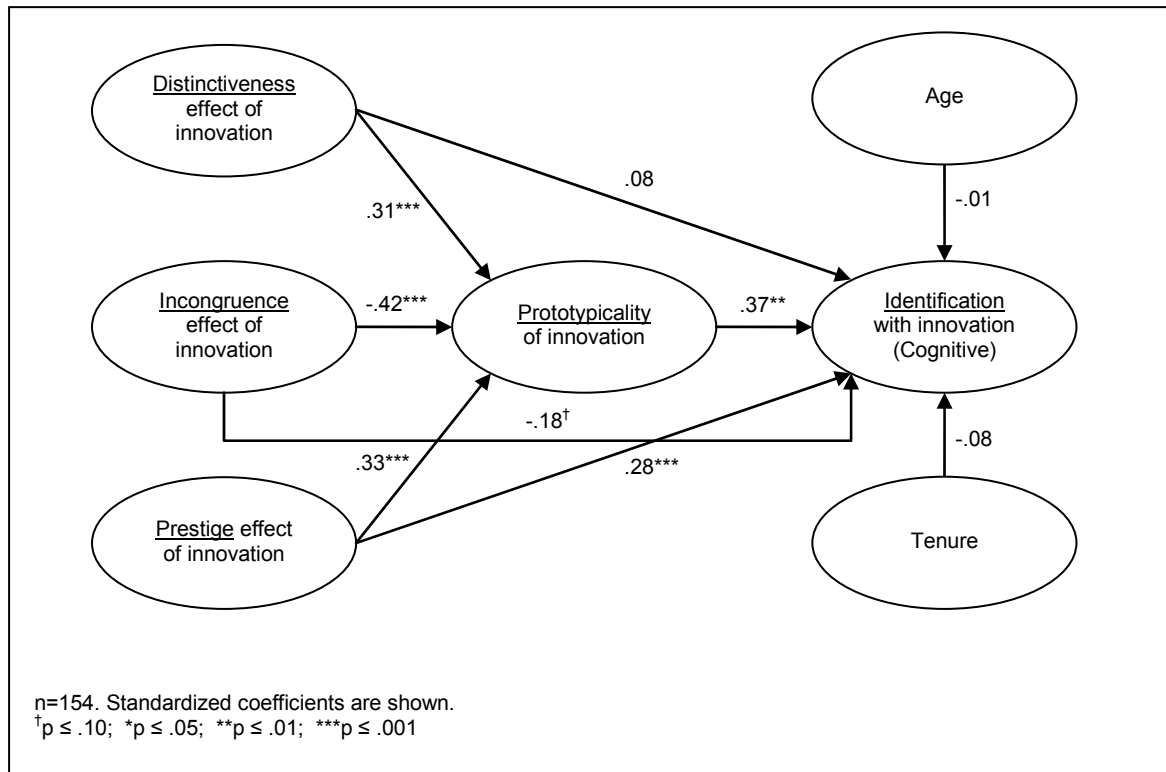


Figure 4.7: Partial mediation model (Inno2)

Another partial mediation model was computed for Inno2, which included only those direct paths from the previous model that had been found to be significant at the level of $p < .10$, that is, the paths from incongruence and from prestige to identification. The fit of this limited partial mediation model was good with $\chi^2/df=1.02$ ($p=.44$), RMSEA=.01, CFI=1.00, TLI=1.00 and NFI=.95, and the comparison revealed a significant improvement in chi-square over the hypothesized, full mediation model ($\chi^2_{df}=11.41$, $df=2$, $p < .01$).

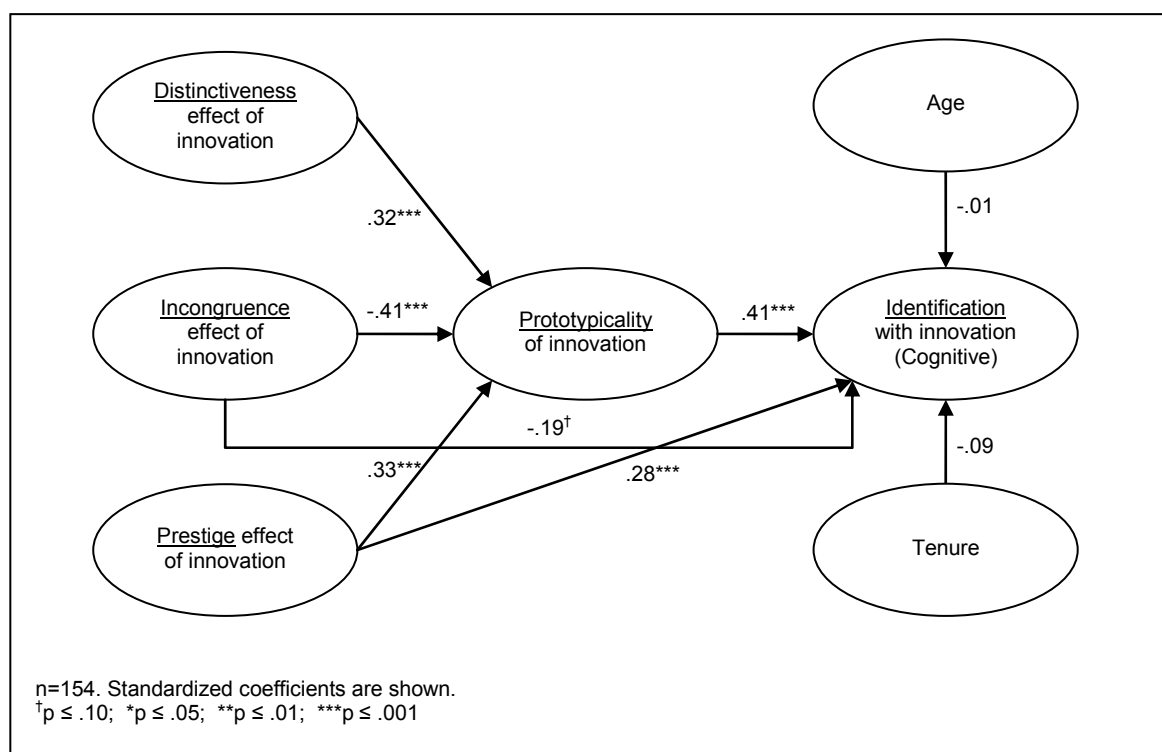


Figure 4.8: Limited partial mediation model (incongruence / prestige only) (Inno2)

For the non-mediation model, the path from prototypicality to identification with the innovation was eliminated, while all other specifications of the complete partial mediation model were kept (see figure 4.9.). The non-mediation model resulted in a very good fit with $\chi^2/df=1.01$ ($p=.24$), RMSEA=.03, CFI=1.00, TLI=.99 and NFI=.95. In comparison to the hypothesized, full mediation model, the non-mediation model did not represent a significant improvement, though ($\chi^2_{df}=3.60$, $df=2$, $p>.10$).

Thus, the examination of global fit criteria confirmed that the hypothesized full mediation model represented the underlying data well. It also showed, though, that a limited partial mediation model yielded a significantly better alternative to the full mediation solution. The controls remained insignificant in all models.

Again, Baron and Kenny's three conditions for mediation were examined (Baron & Kenny, 1986; MacKinnon et al., 2002). The first two conditions were met, as both independent and mediator variables were all significantly related to the dependent variable when assessed independently, without controlling for each other (see figures 4.6. and 4.9.). When controlling for the mediator the direct path coefficients were reduced and became insignificant for the distinctiveness and incongruence effects

(see figures 4.7. and 4.9.). The prestige effect lost in strength, but maintained its significance level ($p < .001$).

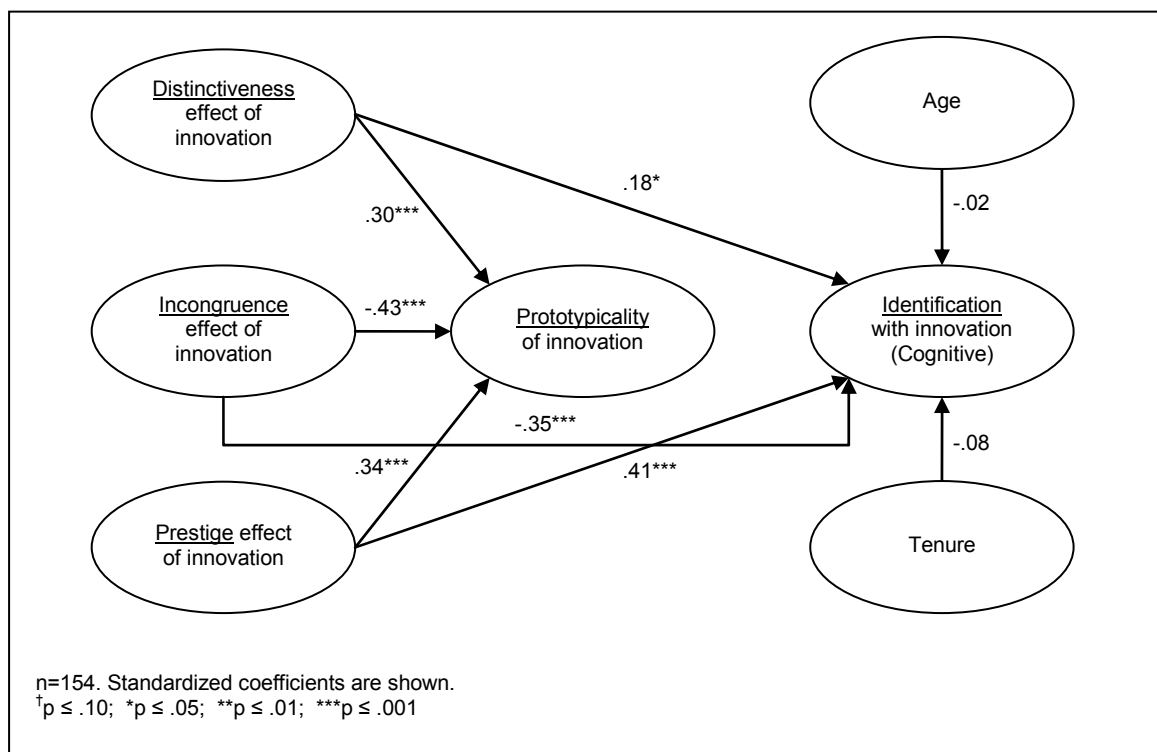


Figure 4.9: Non-mediation model (Inno2)

Summing up both studies, the assessments of Inno2 fully confirmed previous findings for Inno1. Both studies also provided first evidence that the mediation mechanism of prototypicality is independent of different durations or social contexts of sensemaking. In summary, the perceived prototypicality of an innovation, thus, mediates the relationship between perceived organizational identity effects of an innovation and members' identification with the innovation. Members who view an innovation to positively impact organizational identity will imbue it with a high prototypicality for their organization and strongly identify with it. This appears to be valid across different stages of the innovation process. Finally, in both studies, prestige maintained to some extent a direct relationship with identification that was not mediated through prototypicality. Interestingly, in the case of the announced innovation (Inno2), incongruence also came close to conserving a significant direct relationship with identification. Table 4.3 summarizes the findings relating to this chapter's hypotheses:

Hypotheses		Findings
H4a:	Distinctiveness effect of innovation → Prototypicality of innovation	(+) supported
H4b:	Incongruence effect of innovation → Prototypicality of innovation	(-) supported
H4c:	Prestige effect of innovation → Prototypicality of innovation	(+) supported
H5:	Prototypicality of innovation → Cognitive identification with innovation	(+) supported
H6:	Prototypicality fully mediates: D / I / P effects → Cognitive identification with innovation	supported

Table 4.3: Findings for hypotheses H4-6

4.6. Discussion

Theoretical implications

The objective of this chapter was to show how insights from categorization theory can be fruitfully applied not only to individuals, as in SCT, but also to other organizational elements. The organizational elements that came under scrutiny here were a company's product innovations. The main proposition was that organizational members identify with innovations which they perceive to enhance their organization's identity, because they recognize those innovations as being similar to their ideal organizational identity and thereby highly prototypical for their organization. A member's perception of an innovation's prototypicality was thus derived as a mediator between his perception of the innovation's contribution to a positive organizational identity and his identification with the innovation. The two studies that were performed differed as to the characteristics of the innovation. While one study included a product innovation that had been launched recently (Inno1), the other study focussed on a product innovation that had only been internally communicated and was still to be launched (Inno2). Four major insights emanated from both studies. Firstly, both studies confirmed that organizational members see an innovation as prototypical for the organization to the extent that they perceive it to raise the organization's distinctiveness and prestige while not jeopardizing its congruence. As the squared multiple correlation coefficient (R^2) of the prototypicality constructs ranged between .65 and .76 in all models, the antecedents developed in this study can be said to jointly explain more than two-thirds of the variance of an innovation's perceived prototypicality.

Secondly, both studies also established how important prototypicality perceptions are for members' cognitive stances towards innovations. In all models, perceived prototypicality was a significant predictor for members' identification with the innovations, explaining more than half of the construct's variance when assessed jointly with the controls.

Thirdly, the hypothesized relationships upheld most of their strength and significance when assessing innovations in different stages of development. These findings can be interpreted as tentative evidence that the theoretical relationships are valid across different durations or social contexts of sensemaking. Thus, the studies' results support the notion that the theory developed here may have general validity independent of an innovation's development stage or differing external conditions such as market or technological turbulence.

Finally, while both studies clearly indicated that the influence of distinctiveness and incongruence effects on identification was mediated by innovation prototypicality, they also revealed that organizational prestige effects tended to conserve a direct relationship with identification. This direct path from the prestige effect to identification was only barely significant for Inno1, but clearly exceeded standard significance thresholds for Inno2. It seems that members' identification with the innovation will be strengthened whenever they believe it enhances HealthCo's reputation in the market, independently of how representative the innovation is for the member's 'ideal HealthCo'. This is plausible, because members may, often rightfully, believe that the customers' ideals for HealthCo differ from their own. After all, construed ideal external image ('Who do they think we should be?') and ideal organizational identity ('Who do we think we should be?') have been shown to be separate concepts that do not necessarily fully overlap (Dutton et al., 1994; Gioia et al., 2000). The results thus indicate that members identify with an innovation when they believe that it matches customer ideals and thereby increases the prestige of HealthCo with the customers, independently of the innovation's similarity to the member's ideals. It is important to note that the direct and the indirect effects of prestige on identification were both strong for the two innovations. This could imply that when construed external images and idealized internal images of the

organization fall apart, members may identify in an ambivalent way (Elsbach, 1999; Kreiner & Ashforth, 2004) and prediction of identification levels may be ambiguous.

Limitations and future research

The present findings must be considered in the context of the studies' conceptual and methodological limitations. First, while the theory developed in this chapter suggested that insights from categorization theory can be fruitfully applied to innovative organizational elements in general, the empirical tests were limited to a single type of innovation, that is, HealthCo's innovative therapeutic products. It remains to be shown that other innovative intraorganizational elements also possess a graded structure of prototypicality, which determines members' identification with them. Furthermore, as already mentioned in chapter 3.5., an organization's innovative products may represent stronger cues for members' perception of the organizational identity than other intraorganizational innovations such as new organizational processes or workplace technologies. Future research could expand the application of categorization principles to additional types of organizational elements and assess whether graded structure is more pronounced in some of them than in others.

Second, as only two different innovations were assessed, the findings relating to different development stages of innovations must necessarily remain tentative in nature. It needs to be shown through further, more comprehensive assessments of innovations at different development stages whether the theorized relationships vary with different durations and social contexts of sensemaking.

Third, the studies only focussed on a single determinant of prototypicality. Prototypicality of category elements was viewed here as largely driven by the elements' similarity to category ideals. However, frequency of instantiation of a category element had also been identified as a relevant determinant of its prototypicality in categorization research. As frequency of instantiation was not explicitly included here as a determinant of prototypicality, its study may present a worthwhile research effort. In the empirical context of the present studies, it is certainly conceivable that frequency of instantiation may play a role. For instance, sales representatives who frequently deal with a certain product innovation and often

present it to an external audience as an element of HealthCo may more easily come to view it as relatively representative of the organization and, in consequence, identify more strongly with it.

Fourth, an organization was viewed primarily as a goal-derived category, although it can also clearly serve as a taxonomic category to its members' cognition. The present empirical studies did not explicitly probe whether some members viewed their organization as a taxonomic instead of a goal-derived category and whether this would make a difference. It is possible that members who are satisfied with the status quo of their organization may primarily look at their organization as a taxonomic category. They may see it less as a means to achieve certain goals than as a means to classify them in the environment. In taxonomic categories, it is the central tendency of elements that plays an important role in determining their prototypicality. Thus, when the taxonomic aspect of an organization is prevalent, stimuli with average values will tend to be attributed a higher prototypicality (and be received more favourably) than stimuli with extreme values. Members who view their organization primarily as a taxonomic category can thus be expected to more easily process and more favourably view new products that are only incrementally different or 'more of the same'. Real, radical innovations, however, may be better received by members who view their organization as a goal-derived category and are focussed on achieving the organization's ideals. This would only be true, though, as long as the radical innovations are perceived to support organizational ideals. If the radical novelty of an innovation is opposite to the organizational ideal, an interesting paradox may occur. In such instances, members with a taxonomic view of their organization may more strongly identify with such radical innovations than members with a goal-derived view of their organization. This is because an innovation that is in opposite position to the organizational ideal will be more similar or closer to the central tendency than to the organizational ideal. These admittedly quite speculative suggestions need to be refined and assessed in further research.

Fifth, while the studies started out viewing an organization as a single social category, it is recognized that organizations may sometimes have multiple identities (Albert & Whetten, 1985; Foreman & Whetten, 2002), where each identity represents a separate social category. For instance, a pharmaceutical company may be viewed

as both a provider of medical care ('doing good') and a business ('doing well'). Multiple identities of organizations have been argued to exist either in an ideographic or a holographic form (Albert & Whetten, 1985). In the ideographic type, the individual organizational units have separate identities and their combination leads to a multiple identity organization. In the holographic type, different identities are blended or hybridized within the organizational identity so that each unit exhibits the same hybrid identity. For the sake of parsimony, the present studies have treated organizational categories in a simplified way as having single identities. In organizations with dual identities, however, category elements may turn out to be very prototypical for one identity but not for the other. Suppose, for instance, a certain therapeutic innovation may be able to more specifically address a small patient subpopulation, thereby leading to lower adverse effects, but that it also entails higher regulatory and manufacturing costs. Such an innovation may appear quite prototypical for 'HealthCo as a medical care provider', but may probably be a poor representative of 'HealthCo as a business'. In such instances, the degree of identification with an innovation may vary, depending on which aspect of the organizational identity is more relevant to a member's social identity.

Finally, typical methodological caveats apply when data collection is performed mostly based on a single survey instrument and when data is collected at the same point in time. The present, cross-sectional data cannot be postulated to unambiguously support the causality that was theoretically developed. Rather, alternative explanations involving reverse causalities should be taken into consideration in future research. As sensemaking is an iterative process, it would not come as a surprise if the proposed relationships between antecedents and mediator could also be explained in a reversed relationship. A certain image that is created of an innovation after a first round of sensemaking may be called into question and refined through external feedback in a second round of sensemaking and thus bring about a modified image. Thus, attributed prototypicality of the first round of sensemaking may serve as an antecedent to assessments of an innovation's contribution to organizational distinctiveness, congruence and prestige in the second round of sensemaking. Not least, once an image of an innovation is stored in memory in a simplified way and members identify with it to a certain degree, this level of identification may influence how new information regarding the innovation is

processed. In consequence, identification could also be viewed as determining perceptions of prototypicality when conceiving sensemaking of an innovation as an iterative process.

5. Outcomes of Identifying with Innovations: Assessing Affect, Behaviour and Performance

5.1. Introduction

The two previous chapters have developed a novel concept — members' identification with innovations — and attempted to uncover its identity-related antecedents and mediating factors. This chapter now directs the attention to the consequences of identifying with innovations. More specifically, it explores whether and how members' identification with the innovation may drive organizational members' behaviour towards an innovation and its performance. As this study's concept of identification is novel, developing theory and hypotheses as to its consequences represents a first theoretical contribution of this chapter which is central to the scholarly and managerial relevance of the new concept. In addition, the present chapter also comprises a second contribution which adds to another stream of research by directing special attention to a certain type of innovations, new product innovations, and a certain group of organizational members, boundary spanners (Thompson, 1967). This focus is chosen for the following reasons: New products are focussed on, because their proficient development and market management has proven to be of high relevance for an organization's overall performance (Crawford & Di Benedetto, 2006; Griffin, 1997; Hauser et al., 2006; Kleinschmidt et al., 2007). The chapter focalizes on boundary spanners for three reasons. Firstly, boundary spanners are of high relevance for the successful launch of new product innovations (di Benedetto, 1999) which is, again, critical for their overall performance (Hultink et al., 1997; Hultink et al., 2000; Hultink & Robben, 1999; Kleinschmidt et al., 2007). Secondly, identity and identification have been suggested to matter especially at the organizational boundaries (Bartel, 2001; Elsbach, 2001; Pratt, 2000; Rousseau, 1998). Identity-related perceptions are therefore expected to have a tractable influence on boundary spanners and their promotion of an innovation. Thirdly, organizational identity and identification research on boundary spanners is still scarce (for recent exceptions see (Ahearne et al., 2005; Bartel, 2001; Richter et al., 2006)), but initial research in the adoption literature has suggested that boundary spanners' attitudes and behaviours may be directly related to new product performance (Atuahene-Gima, 1997; Hultink & Atuahene-Gima, 2000).

It has traditionally been suggested that occupants of boundary roles serve two different classes of functions. These are, firstly, information processing and, secondly, external representation (Aldrich & Herker, 1977). As to the first function, Aldrich and Herker suggested that boundary spanners both filter and facilitate information transmittal from the environment to the organization. They proposed that an organization's adaptability to environmental contingencies partly depends on the boundary spanners' ability to select, transmit and interpret relevant environmental information. Aldrich and Herker noted that innovation and change are often a result of this information being brought in by boundary spanners, which secures the organization's adaptability and survival. Tushman (Tushman, 1977) laid out in more fundamental detail how boundary spanners acquire and process information across internal and external organizational boundaries and how critical this function is for an organization's innovation processes. Over the following decades, the information processing and communication function of boundary spanners has received extensive attention in innovation research (for reviews see (Damanpour, 1991; Fiol, 1996)).

In contrast to the boundary-spanning role of information-processing, the boundary-spanning function of external representation has received considerably less attention in innovation research. This chapter addresses attitudes and behaviours which are related to the second class of boundary spanning functions. In defining external representation, Aldrich and Herker note: *"Included under the external representation function are all boundary roles that involve resource acquisition and disposal, political legitimacy and hegemony, and a residual category of social legitimacy and organizational image. Boundary roles concerned with resource acquisition and disposal include purchasing agents and buyers, marketing and sales representatives, personnel recruiters, admissions officers, and shipping and receiving agents. In these roles the organization is represented to the environment, because the normal flow of authoritative commands is from the core of the organization to these boundary roles."* (Aldrich & Herker, 1977) p.220).

Among the different stages of a new product development process (Brown & Eisenhardt, 1995; Cooper, 1990, 1994, 2008), the external representation function of

boundary-spanning members comes into perspective, at latest, at the launch of the innovation. However, external representation may often be of importance for the innovation development process and its success well before the actual launch stage. For instance, the announcement of new products before their launch has for decades become standard practice of many innovating organizations (Eliashberg & Robertson, 1988). Such preannouncements may be supported or carried out by boundary spanners in their external representation role. It has been shown that preannouncements induce potential customers to direct their attention toward the innovation and to eagerly await its launch, which again may positively impact new product success (Schatzel & Calantone, 2006). Boundary spanning members may not always be involved in new product preannouncements, though. As this chapter's interest is in boundary-spanning behaviours, the analysis selectively focuses on the step of the new product development process in which boundary spanners are most heavily involved, i.e. the new product launch.

Appropriately chosen launch strategies and their successful implementation during the launch stage have proven critical for overall NPD success (Hultink et al., 1997; Hultink et al., 2000; Hultink & Robben, 1999; Kleinschmidt et al., 2007). Thus, a properly planned and implemented launch has been recognized as a critical 'invisible' innovation success factor (Cooper, 1999). Among the different elements pertaining to a comprehensive launch strategy, boundary spanners' skills and resources have proven to be significantly related to the successful launch of an innovation (di Benedetto, 1999). In addition, DiBenedetto also studied more fine-grained tactical launch activities. Interestingly, he found that establishing overall direction for the product launch proved to be among the strongest drivers of new product launch success (di Benedetto, 1999). This finding was affirmed consistently across all different types of success measures including overall profitability, competitive profitability, competitive sales and competitive market share. DiBenedetto's findings complement Rackham's insights that boundary spanning members lacking adequate training and orientation towards an innovation can make them fail, even if the innovations are by themselves totally viable (Rackham, 1998). The members' sense and understanding of where a new product launch is leading thus appears to be of critical importance for a successful innovation.

The above-mentioned research has focussed on the importance of appropriately training boundary-spanners in order to provide them with the necessary knowledge resources for successfully launching the product. Surprisingly, hardly any research seems to have considered the possibility that boundary spanning members may still not support the launch of the innovation even with comprehensive training and a full understanding of the given directions. This could be the case whenever boundary spanners are expected to externally represent an innovation but individually experience internal conflict in adopting it. Innovation adoption is here understood as *"the process through which an individual or other decision-maker unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision"* (Rogers, 1983) p.163). While research on innovation adoption and diffusion at the organizational and industrial level is extensive and well-established (Gatignon & Robertson, 1985, 1989; Norton & Bass, 1987; Rogers, 1983), research on individual innovation adoption within organizations is limited (for a recent review see (Frambach & Schillewaert, 2002)). Inquiring intraorganizational adoption processes separately from other diffusion research appears warranted, if not necessary, because innovation diffusion processes follow different patterns and seem to be influenced by other factors at the individual than at organizational or interorganizational levels (Cool, Dierickx, & Szulanski, 1997).

Most of the intraorganizational, individual adoption literature has focussed on the adoption of new workplace technologies such as information technology (as reviewed by (Frambach & Schillewaert, 2002)). In taking this lens, previous research has primarily studied how organizations and their members react towards innovations which have been externally developed and brought in from the outside. By way of extension, the present study recognizes the possibility that organizational members may experience difficulties in personally adopting the innovations of their own organization. Again, the focus is directed towards boundary spanning members and their external representation function, because consequences of adoption or non-adoption are expected to be most visible there. The few studies which have considered the adoption of an organization's innovations by its boundary spanning members and the consequences as to their external representation function will be presented in the following section.

Boundary spanners' adoption of innovations

Over the past decade, first studies have started investigating the relationship between boundary-spanners' external representation function, their adoption of the organization's innovations and the success of innovations (Anderson & Robertson, 1995; Atuahene-Gima, 1997; Hultink & Atuahene-Gima, 2000). The present study differs from all three studies in suggesting a more differentiated concept of adoption at the individual level by separating attitudinal and behavioural aspects. Thus, in reviewing these prior studies, special attention will be dedicated to their understanding of innovation adoption at the individual level. More explicitly, the studies differ as to the degree to which they conceptually separate, firstly, individual from contextual influences, secondly, attitudinal from behavioural components, and, thirdly, cognitive from affective dimensions within their understanding of adoption. These criteria are conditional upon each other, i.e. meeting the first two is a prerequisite for addressing the third. The subsequent review delineates that prior work on boundary spanners has not yet provided a differentiated understanding on innovation adoption down to the third criterion. This is a significant gap, however, because differentiating cognitive from affective dimensions may be of particular relevance for the understanding of resistance or acceptance of innovative change (Piderit, 2000) as well as boundary spanners' motivation and job performance (Miao & Evans, 2007).

The first piece of research on boundary spanners' innovation adoption to be discussed here is Anderson and Robertson's study on multiline salespersons' adoption of house brands (Anderson & Robertson, 1995). Although the introduction of house brands may at first sight not necessarily qualify as an innovative activity, Anderson and Robertson explicitly point out that they chose an empirical setting where the introduction of house brands would carry innovative characteristics. They selected the financial industry of the late 1980s, when house brands had only recently been introduced and become a subject of discussion. Anderson and Robertson tested sets of antecedents as determinants of salespersons' adoption, including employer management factors, salesperson background factors and customer factors which may lead to salespersons' adoption of house brands. They also hypothesized that adoption would be mediated by salespersons' expectations towards customer mobility hazards as well as by the salespersons' dependence on

their organization. Anderson and Robertson found that 29% of the variation in a salesperson's adoption could be explained by six variables. A salesperson's exposure to training, greater career success and dependence on the organization supported adoption, while a salesperson's increasing experience, reliance on external sources and expectation of losing customer loyalty tended to hinder adoption. In conceptualizing salespersons' adoption, Anderson and Robertson drew on a *consumer* adoption and diffusion model developed by Gatignon and Robertson (Gatignon & Robertson, 1985) which is subsequently laid out.

Gatignon and Robertson's (Gatignon & Robertson, 1985) model basically distinguishes two processes, a process of innovation adoption by the *consumer* and a process of innovation diffusion in the *market*. Both processes are embedded in and influenced by other determinants such as the surrounding social system, personal or innovation characteristics. Gatignon and Robertson differentiate the adoption process according to the degree of cognitive processing involved. Under conditions of high cognitive involvement, they suggest an adoption process to encompass the following steps: awareness, knowledge, attitude formation, trial and adoption. Under conditions of low cognitive involvement the proposed adoption process is slightly simplified and comprises awareness, trial, attitude formation, and adoption. Thus, in their model, adoption really represents only the last step of the adoption process. To them, adoption represents the outcome or the result of the adoption process and is understood as the degree to which the innovation is used by the adopter. They differentiate this understanding of 'adoption as usage' into two dimensions, including *width* (e.g. number of different uses for the innovation) and *depth* (e.g. amount of usage of the innovation). It is helpful to keep in mind that Gatignon and Robertson's model was developed as a model of consumer behaviour. It describes what factors drive consumer adoption of innovations which leads to innovation diffusion in social systems (Gatignon & Robertson, 1985).

Anderson and Robertson attempted to adapt this conceptual consumer model to boundary spanners. Within their study context of salespersons, they defined adoption as the "*extent to which a salesperson makes house brands a proportion of his or her total sales*" ((Anderson & Robertson, 1995) p.18). By defining adoption in terms of realized sales, Anderson and Robertson limited their focus to the outcome of the

adoption process. This definition cannot capture whether the salespersons go through any of the attitudinal or behavioural steps which were present in the original consumer model (Gatignon & Robertson, 1985). Anderson and Robertson recognized that their approach does not clarify whether a salesperson has cognitively and affectively accepted house brands, nor the amount of effort that he is devoting towards the innovation. On the contrary, their definition suggests that salespersons have adopted an innovation whenever customer receptivity is high, independent of salespersons' cognitive or affective stance toward the innovation.

It becomes evident, that in allowing customer receptivity as an *external* element to become a key determinant of adoption, their approach becomes inconsistent with the underlying model by Gatignon and Robertson's (Gatignon & Robertson, 1985). Their original consumer adoption model conceives of adoption as a process taking place purely at the individual level, leading from internal attitudinal dispositions of consumers to their internal decision of purchasing to individual behaviour towards an innovation (i.e. usage). In this original model, external influences only come into play once the adoption process has been completed. External influences do not impact the adoption process but the subsequent diffusion process (Gatignon & Robertson, 1985). A consistent adaptation of Gatignon and Robertson's consumer adoption model to the realm of salespersons, should have maintained that the adoption process takes place purely at the individual level and that external elements (such as customer receptivity) exert their influence after adoption has taken place. Viewed in this light, Anderson and Robertson's understanding of adoption as the proportion of *realized* house brand commissions is more akin to the concept of innovation diffusion in Gatignon and Robertson's original consumer model than to innovation adoption. A more consistent definition of salespersons' adoption of house brands should have focussed on salespersons' *attitudes and behaviours* towards reaching a certain *intended* proportion of house brand commissions. This view of adoption was implemented in the studies which are reviewed in the following sections.

Hultink and Atuahene-Gima (Hultink & Atuahene-Gima, 2000) went a step further in assessing not only the outcome of the adoption process but also in explicitly considering some of the steps of the adoption process including attitudes and behaviours. Their theoretical approach is based on Atuahene-Gima's earlier

conceptual study on the adoption of innovations by salespersons in which he also proposed sets of adoption antecedents and consequences (Atuahene-Gima, 1997). In his study, Atuahene-Gima aimed at providing a more adequately defined domain or dimensionality of salespersons' adoption of innovations than Anderson and Robertson. Recognizing that Anderson and Robertson had neglected the attitudinal and behavioural aspects of adoption, he defined adoption as "*the interaction between the degree to which they accept and internalize the goals of a new product (i.e. commitment) and the extent to which they work smart and hard (i.e. effort) to achieve these goals.*" (Atuahene-Gima, 1997) p.500). Atuahene-Gima thereby more explicitly acknowledged salespersons as internal customers of the innovation who may accept or reject it, engage in supportive or dysfunctional behaviour towards it and drive or thwart its performance. Ergo, he clearly limited adoption to the individual and suggested that a high degree of adoption is an indication that the salesperson has recognized that the innovation's goals are highly congruent with his goals and values.

Hultink and Atuahene-Gima tested this refined view of adoption in an empirical study conducted among the salesforce of high technology firms in the Netherlands and assessed its impact on the sales performance of the most recently introduced new product of the respective firm (Hultink & Atuahene-Gima, 2000). Following Atuahene-Gima's conceptual lead, they defined adoption as the product of the individual salesperson's commitment and effort towards the innovation (Hultink & Atuahene-Gima, 2000). They recognized that both commitment and effort could have independent effects on the innovation's performance, but suggested that a combination would yield a greater impact than each factor alone. Hultink and Atuahene-Gima's understanding of innovation performance was drawn from Sujan and colleagues' concept of selling performance (Sujan, Weitz, & Kumar, 1994) which captures the self-reported success of a salesperson in achieving sales volumes or market shares.

Hultink and Atuahene-Gima found strong evidence for their hypothesis that adoption (i.e. commitment x effort) was positively related to innovation performance. They also found that effort alone was not correlated to innovation performance. Excluding effort from the adoption construct, which limits the content domain of adoption to commitment, reduced the effect of adoption on performance to non-significance.

Among the other variables assessed in their study, a few more are of relevance for the present work.

Firstly, Hultink and Atuahene-Gima found that internal marketing is critical for an innovation's selling performance, especially when internal marketing is allowed to interact with innovation adoption. The internal marketing construct included items such as the degree to which managers had communicated and salespersons had understood the innovation's fit with the company's strategic objectives. They concluded that these findings underline the importance of the internal launch of the innovation to achieve salespersons' adoption in terms of commitment and effort.

Secondly, and seemingly in contrast to the internal marketing findings, the amount of training received was unrelated to selling performance and even proved to be detrimental to the effect of adoption on innovation performance. In attempting to explain these surprising findings, they had recourse to Rackham (Rackham, 1998) who had observed that companies may experience innovation performance losses when placing emphasis on a product-centered instead of a customer-centered training. However, a different explanation may also be possible. Their commitment construct included items which represent a very personal link between the salesperson and the innovation, e.g. by alluding to the salesperson's emotional attachment to the innovation, or the meaning which the product has to him personally. Achieving this depth of 'commitment' towards the innovation implies a process of extensive sensemaking (Weick, 1995; Weick et al., 2005) which yields a very personalized image of the innovation (see chapter 4.3.1.). Internal marketing, in providing favourable facts and stories, can support member sensemaking by sensegiving (Gioia & Chittipeddi, 1991) and thereby strengthen commitment. Training, however, may achieve the opposite, when it proposes preset recipes which the salesperson is expected to present towards the customer. The more a salesperson is trained to strictly follow a preset selling scheme and the more detailed and rigid such a scheme is, the less leeway he will have to present the innovation in his 'own' way, according to the image he has created of it. Thus, while their subjective image of the innovation may induce salespersons to sense a strong commitment and to devote effort towards it, rigid training schemes may inhibit them in externally presenting the innovation in their preferred way. Training might thus reduce

the positive effect of commitment on performance. This explanation would be consistent with Hultink and Atuahene-Gima's additional findings that attention from supervisors, operationalized as overseeing rather than helping, was also negative for innovation selling performance. Just like training, supervisor oversight could also reduce the freedom of a salesperson to focus on the goals and values he personally finds embodied in the innovation. In such instances, a salesperson may perceive a high congruence between his and the innovation's values and goals and therefore be highly committed to the innovation, but be less effective the more he is 'forced' by training or supervision to present the innovation in a different way. Summing up, Atuahene-Gima and Hultink's conceptual and empirical works introduce a detailed conception of boundary spanners' innovation adoption which is more consistent with the concept of adoption in consumer behaviour than prior attempts, because their approach, firstly, explicitly assesses attitude formation and behaviour and, secondly, excludes external influences such as customer receptivity.

The present study extends the prior works, outlined above, in several ways. Firstly, it differs from Anderson and Robertson's approach in recognizing boundary spanners' adoption of an innovation as an individual, largely internal process which is not directly influenced by external elements. External influences from the social system are not considered to belong to the adoption process. Rather they are viewed as impacting diffusion of the innovation after the salespersons' adoption has taken place. This implies that the results which an innovation achieves in the market are here understood to be a consequence, not a part of, the adoption process. The present approach is thus consistent with Gatignon and Robertson's view, as well as Rogers' definition of adoption as "*the process through which an individual or other decision-maker unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision*". (Rogers, 1983) p.163). Secondly, the present study differs from Anderson and Robertson's work by explicitly assessing different steps throughout the adoption process including cognitive and affective dispositions, as well as effort devoted toward the innovation. This study concurs with Hultink and Atuahene-Gima's study in recognizing that attitude formation constitutes a critical part of the adoption process. Their study falls short of parsimoniously assessing such attitude formation in three major ways, though.

Firstly, they do not convincingly explain, why they mingle an attitudinal (commitment) and a behavioural component (effort) within their adoption construct instead of assessing their dependencies and independent effects on performance in more detail.

Secondly, their definition and operationalization of commitment lacks, at least in retrospect, theoretical rigour and is inconsistent with today's understanding of commitment. There is a wealth of research on commitment within organizational settings including research on commitment to organizations (Allen & Meyer, 1990; Bergami & Bagozzi, 2000; Gautam, Van Dick, & Wagner, 2004; Meyer & Allen, 1997; Meyer, Allen, & Smith, 1993; Meyer, Becker, & van Dick, 2006; O'Reilly & Chatman, 1986; Riketta, 2005), commitment to intraorganizational innovations (Klein & Sorra, 1996) or, more generally, commitment to change (Herold, Fedor, & Caldwell, 2007; Herscovitch & Meyer, 2002), as well as on organizational commitment in boundary-spanning contexts (Jaramillo, Mulki, & Marshall, 2005; MacKenzie, Podsakoff, & Ahearne, 1998; Sager & Johnston, 1989; Speier & Venkatesh, 2002). Although definitions of commitment differ, extant research has generally come to understand commitment as "*a force that binds an individual to a target (social or non-social) and to a course of action of relevance to that target*" (Meyer et al., 2006) p.666). When comparing the definition of commitment to definitions of identification (see chapter 3.2.1.), it becomes apparent that both concepts are theoretically and empirically distinct (Bergami & Bagozzi, 2000; Gautam et al., 2004; Meyer et al., 2006). Commitment towards a target is often an outcome of a process of identification with the target (Meyer et al., 2006). However, commitment is not necessarily driven by identification, but can also often result from exchange-based expectations (van Dick et al., 2004). For instance, a salesperson's committed behaviour may not be driven by his identification with the innovation, but by his expectation to meet sales quotas and thereby increasing his salary. Hultink and Atuahene-Gima appear to not have consistently differentiated commitment from identification. Their proposition that the internalization of an innovation's values and goals acts as a key motivational driver for a salesperson bears resemblance to the concept of identification. Their measurement items, however, mostly reflect commitment in capturing to what extent

the individual feels bound to a certain course of action of the innovation and in what way he intends to behave.

Thirdly, Hultink and Atuahene-Gima's study does not differentiate between cognitive and affective aspects of attitude formation which have both been shown to be important and distinct determinants of boundary spanners' motivation (Miao & Evans, 2007).

Summing up the above argument, it is suggested here that the identification concept may more adequately represent the attitude formation step within the adoption process. Firstly, its conceptual domain can be clearly separated from behaviours and behavioural intentions, in contrast to the commitment concept. This study thus extends prior work in explicitly focussing on the attitude formation process, without mingling behavioural intentions. This is achieved here by directly assessing the perceived congruence between the boundary spanner and the innovation and evaluating its potential as a motivational driver of effort and performance. The concept of identification, secondly enables a clear distinction between cognitive and affective aspects of identification (for a review see (Riketta, 2005)) and thereby offers more differentiated insights into attitude formation within the adoption process.

In conclusion, the present chapter comprises two major contributions. Firstly, this chapter represents the first study which explores behavioural and performance consequences of the previously developed novel concept of members' identification with innovations. Hence, each hypothesis regarding identification consequences which is subsequently derived constitutes a theoretical contribution in itself. Secondly, this chapter also provides a specific contribution to boundary-spanning research in the organizational, marketing and innovation literatures. Specifically, it contributes a novel perspective on boundary spanners' adoption of innovations which theoretically and empirically distinguishes cognitive, affective and behavioural elements, explores their relationships and shows their distinct effect on an innovation's market performance. Ergo, the following derivation of hypotheses draws on related prior research from boundary spanning and other relevant literatures, wherever possible.

5.2. Hypotheses: Consequences of identification with innovations

5.2.1. Cognitive identification and innovation performance

In order to relate a member's cognitive identification to an innovation's performance, the latter needs to be defined. As outlined above, a key role of boundary-spanning members is to support and externally represent their organization (Aldrich & Herker, 1977). Once an organization has developed an innovation (e.g. a new product), its launch into the market environment is typically supported by boundary-spanning members who positively present the innovation to external audiences. The success of an innovation in the present context is understood as its selling performance, e.g. its sales volume. This approach equates the innovation's performance to the boundary spanners' selling performance, which is commensurate with prior work focussing on the external representation function of boundary spanning (Hultink & Atuahene-Gima, 2000; Sujana et al., 1994). Hence, an innovation's performance subsequently corresponds to a boundary spanner's selling performance of the innovation and both notions can be used interchangeably.

When a member strongly identifies with an innovation, his positive stance towards the innovation is expected to act as a motivational force for his behaviour. This can be easily derived from prior theorizing about identification with innovations (see chapters 3.2.1. and 4.3.). When a member has made sense of an innovation as being highly prototypical for his organization and therefore identifies with it, he will have a strong personal interest in externally representing it and ensuring its success. This is, because in externally representing a highly prototypical innovation, he is associating himself with an element of the organization which is close to his ideals and which he expects to be prestigious with relevant external audiences. Externally representing the innovation thus allows a member to "*bask in the reflected glory*" ((Cialdini et al., 1976) p.366) of the innovation. Moreover, an organizational member will be motivated to ensure the success of a highly prototypical innovation for at least two reasons. Firstly, its success in the market will allow the innovation to become a confirmed element of the organization's portfolio, thereby making the innovation-associated enhancement of the organizational identity permanent. Secondly, its acceptance by the market will provide external validation of the legitimacy and economic viability of the organizational ideals. Both effects support the individual's

social identity as an organizational member. Highly identified members, thus, have an intrinsic, self-serving motivation when externally representing the innovation, apart from any potential extrinsic bonuses or other incentive schemes. This is commensurate with extant social identity research which has argued that cognitive identification with organizational elements supports individuals' motivation at work (Ellemers et al., 2004). Such motivations are expected to positively impact boundary spanners' sales performance (Churchill Jr., Ford, Hartley, & Walker Jr., 1985).

Developing the expected negative effects of a low degree of identification on an innovation's performance requires more elaboration. While favourably representing their organization's innovation is a core duty of boundary spanners, this duty may become a source of psychological stress for boundary spanners who do not identify with the innovation. Cognitive identification had been defined as the degree to which an individual defines himself by the same attributes that he believes define the innovation. This congruence had been equated to the degree of perceived overlap between an individual's image of the innovation and his identity (see chapter 3.2.). In contrast to prior works on boundary-spanners' adoption outlined above, this new conceptualization is capable of parsimoniously representing boundary-spanners' cognitive congruence with the innovation without mingling it with emotional, evaluative or behavioural aspects. As shown in chapter 3, boundary spanners may not identify with an innovation when they perceive the innovation to degrade their organization's distinctiveness, congruence or prestige. In such instances, they will sense a conflict within their role, because they are expected to support both, the organization and the innovation. Role conflict has been described as a perceived incompatibility among orders or expectations within a certain role (Rizzo, House, & Lirtzman, 1970). Role conflict has important ramifications as it is one of the best established causes for organizational members' dissatisfaction and psychological withdrawal from their job (Bedeian & Armenakis, 1981; Jackson & Schuler, 1985; Podsakoff, LePine, & LePine, 2007). Recent work focussing specifically on boundary-spanning members has confirmed previous findings from more general intraorganizational research, showing that role conflict is significantly related to boundary-spanners' job dissatisfaction (Bettencourt & Brown, 2003). Beyond its strong influence on attitude, role conflict has also been shown to impact the performance of organizational members in various tasks (Jackson & Schuler, 1985).

Jackson and Schuler offered two explanations, a cognitive and a motivational one. From a cognitive perspective, role conflict can be understood to impede task performance by misdirecting and confusing members' attention, thereby making them more inefficient. From a motivational perspective, role conflict hinders performance when it induces negative effort-to-performance and performance-to-reward expectations among organizational members. Jackson and Schuler note, though, that empirical evidence for the negative relationship between role conflict and task performance is modest (Jackson & Schuler, 1985). Research on boundary-spanning members has confirmed these findings, specifically showing that role conflict has a strong negative effect on boundary-spanners' external representation function (Bettencourt & Brown, 2003). In conclusion, it is proposed that boundary-spanning members who do (not) identify with innovations they externally represent will incur performance gains (losses) during the launch of such innovations.

Hypothesis 7 (H7): The stronger a boundary-spanning member cognitively identifies with an innovation, the better the performance of the innovation.

5.2.2. Cognitive identification and effort

While a boundary spanner's cognitive identification with an innovation may have direct consequences for its performance due to motivational reasons, it may also indirectly impact innovation performance by influencing behaviour such as the effort which boundary spanners exert towards the innovation. Although effort is a widespread and well-known concept in the public domain, it has proven difficult to define, due to its invisible, internal and hypothetical nature (Yeo & Neal, 2004). Based on Naylor's classical definition, effort has often been viewed as being composed of two dimensions (Naylor, Pritchard, & Ilgen, 1980). Naylor's first dimension, effort persistence, refers to the time which is committed to the task, while the second dimension, effort intensity, denotes the energy exerted on the task per unit of time (Naylor et al., 1980). Both dimensions have been extensively assessed with some studies focussing on the time-on-task dimension, e.g. (Blau, 1993; Brown & Peterson, 1994; Fisher & Ford, 1998; Katerberg & Blau, 1983) and others also considering the intensity with which the task is performed e.g. (Brown & Leigh, 1996; Terborg & Miller, 1978; Yeo & Neal, 2004). Besides this dual notion of effort, other

related concepts have been proposed and tested, such as a differentiation between 'working hard' vs. 'working smart' (Sujan et al., 1994), or the notion of 'achievement striving' as composed of the dimensions attention/direction and intensity/persistence (Barrick, Stewart, & Piotrowski, 2002). Research on effort conducted in boundary-spanning contexts has long since mirrored this definitional diversity, with some studies choosing a persistence perspective on effort e.g. (Brown & Peterson, 1994), also used by (Behrman & Perreault Jr., 1984; Mowen, Keith, Brown, & Jackson Jr., 1985; Srivastava, Pelton, & Strutton, 2001; Sujan, 1986), and others mixing persistence and intensity dimensions within a single construct e.g. (Atuahene-Gima & Micheal, 1998). Identification is related to effort by its motivational effect, as research has consistently shown that identification with an organizational target leads to greater employee compliance and higher work motivation (see (Pratt, 1998) for a review). Motivation, again, has long been known to exert a significant influence on the allocation of an individual's effort (Blau, 1993; Katzell & Thompson, 1990). Cognitive identification with organizational targets has been argued to influence individuals' motivation at work (Ellemers et al., 2004) and their selective deployment of effort towards different tasks (Bartel, 2001). If cognitive identification indeed acts a motivational force, as has been argued in the previous chapter, it can be expected to influence the allocation of effort towards the identification target. It is thus inferred that cognitive identification with the innovation will lead boundary spanners to exert more intensive and persistent effort towards promoting the innovation.

Hypothesis 8 (H8): The stronger a boundary-spanning member cognitively identifies with an innovation, the more effort he will dedicate towards the innovation.

5.2.3. Effort and innovation performance

Effort has often been conceptualized as mediating the relationship between motivational factors and performance at work (Naylor et al., 1980; Walker Jr., Churchill Jr., & Ford, 1977). Empirical studies on effort have provided ample evidence that self-reported effort intensity and persistence are positively associated with boundary spanners' selling performance. For instance, Behrman and Perreault found that boundary spanners who allocated more time to their sales task performed

better (Behrman & Perreault Jr., 1984). These findings were largely confirmed in studies on boundary spanners by Sujan (Sujan, 1986), by Brown and Peterson (Brown & Peterson, 1994) and by Mowen and his colleagues (Mowen et al., 1985) where effort was not rated by the boundary spanners, but by their managers. Interestingly, a few contradictory results also exist denying a relationship between effort and performance. For example, Sager and Johnston found that boundary spanners' effort was unrelated to performance (Sager & Johnston, 1989). However, their assessment of performance was different from the present and the above-mentioned previous studies. Their understanding of performance was not limited to the boundary spanners' selling performance, but also included such aspects as their relationship with store managers and reporting and record keeping abilities as evaluated by their managers. Hultink and Atuahene-Gima's study also found that effort was uncorrelated with performance (Hultink & Atuahene-Gima, 2000). In contrast to Sager and Johnston, their understanding of performance is very similar to the present study in focussing on sales performance. Their study is therefore discussed in more detail.

The difference between Hultink and Atuahene-Gima's study and the present work lies in their conceptualization of effort. Their formative construct captured whether a boundary spanner dedicated relatively more effort to the innovation than to other products when carrying out sales-related tasks. It thus gauged within-person differences in exerting effort to several products. Their performance construct, however, was inconsistent with the effort construct. It did not capture the relative performance of the innovation as compared to other products, but merely asked in an absolute way to what extent the boundary spanner perceived to have achieved successful selling performance with the innovation. Thus, while on the one hand many respondents may have rated their *effort* towards the innovation in relation to *other products* (within-person), on the other hand they may have rated their *performance* in relation to *other boundary spanners* (between-person). Responses which were given from a within-person perspective for effort and a between-person perspective for performance may have hidden the true relationship between effort and performance. In view of this shortcoming, the above theoretical reasoning and empirical evidence it is proposed that an innovation's selling performance will indeed be related to the amount of effort which boundary spanners deploy towards it.

Hypothesis 9 (H9): The more effort a boundary-spanning member dedicates to promoting the innovation, the better the innovation will perform.

5.2.4. Cognitive identification and extra-role behaviour

The above sections have proposed behavioural as well as outcome performance consequences of a boundary spanner's identification with an innovation. Sales performance and selling effort can both be said to belong to the domain of a boundary-spanners' 'task' or 'in-role' behaviour (Borman & Motowidlo, 1993; MacKenzie et al., 1998), because they are an inherent part of his external representation function. In addition to this in-role behaviour, members may also display behaviour which extends beyond their job description and supports other organizational goals (Katz, 1964; Organ, 1988). From a cognitive, social-exchange perspective, such extra-role behaviour has been argued to be deliberately exerted by the organizational member in order to achieve equity for being treated fairly by the organization (Organ, 1988). Extra-role behaviour has been extensively researched in organizational contexts, often using concepts such as organizational citizenship behaviour, contextual performance, pro-social organizational behaviour, helping or altruism (for reviews see (Bergeron, 2007; Organ & Ryan, 1995; Podsakoff, MacKenzie, Paine, & Bachrach, 2000)). Following VanDyne et al., extra-role behaviour is here understood as "*behaviour which benefits the organization and/or is intended to benefit the organization, which is discretionary and which goes beyond the existing role expectations*" (Van Dyne, Cummings, & McLeanParks, 1995) p.218). In being positive and discretionary, extra-role behaviour is, firstly, not specified in advance, secondly, not recognized by formal reward systems and, thirdly not a source of punitive consequences when not performed (Van Dyne & LePine, 1998).

Within the stream of organizational identity research, identification with an organization has very early been proposed to lead to the display of extra-role behaviours by its members (Dutton et al., 1994). Organizational research has argued that identification aligns individual and organizational interests. Thus, a member who cognitively identifies with the organization supports himself by supporting the organization (Dutton et al., 1994). Hence, extra-role behaviour is not understood here

as a calculated action which is carried out in order to achieve equity with the organization, e.g. after being treated fairly by the organization (Organ, 1988). Extra-role behaviour is rather understood as self-serving, because the member cognitively senses oneness with the target which he supports. The proposition that members' organizational identification is associated with extra-role behaviour has found extensive empirical support (for a review see (Riketta, 2005)). Related concepts such as organizational commitment or person-organization-fit have also consistently been shown to be associated with extra-role behaviours, in general (LePine, Erez, & Johnson, 2002) as well as in boundary spanning contexts (Netemeyer & Boles, 1997; Piercy, Cravens, Lane, & Vorhies, 2006).

While most extant research has focussed on the organization as the target of identification, more recent studies have focussed on the possibility of multiple identification targets within an organization and their consequences for extra-role behaviours (Olkkonen & Lipponen, 2006; van Dick et al., 2004). These studies have shown that identification towards a certain intraorganizational target leads to the display of extra-role behaviour toward that target (Olkkonen & Lipponen, 2006; van Dick et al., 2004). Adopting the view that innovations are intraorganizational elements which can be targets of identification (see chapters 3.2. and 4.2.), it is proposed that boundary-spanning members who cognitively identify with them will display greater extra-role behaviour in support of the innovation.

Hypothesis 10 (H10): The stronger a boundary-spanning member cognitively identifies with an innovation, the more extra-role behaviour he will display in support of the innovation.

5.2.5. Cognitive identification and affective identification

Up to this point, identification has been treated as a unidimensional concept, with an exclusive emphasis on its cognitive aspect. However, within the social identity approach, identification was argued at an early stage to consist of additional dimensions (Tajfel, 1981) (for reviews see (van Dick, 2001; van Dick et al., 2004)). This chapter integrates the affective dimension into the previously developed concept of identification with innovations and relates it to the cognitive dimension. While the

cognitive component of identification denotes a member's self-classification with a certain category (see chapter 2.2.), affective identification refers to an individual's emotional attachment to a category which includes an assignment of positive or negative feelings to that category (van Dick, 2001).

Based on the social identity approach, cognitive identification of organizational members with an innovation was defined above as the extent to which members perceive the innovation as possessing a large overlap with their social identity (see chapter 3.2.1.). Affective identification with an innovation, then, is here defined as an organizational member's emotional attachment to the innovation, once he perceives it to be congruent with his social identity. Following Bagozzi et al., affect is viewed as an 'umbrella' concept for diverse related 'hot' cognitions (Bagozzi, Gopinath, & Nyer, 1999). The terms 'affect', 'emotions' and other 'hot cognitions' will thus be used interchangeably in this chapter. Affective identification can be seen as a consequence of cognitive identification. Research in organizational identification has argued that cognitive identification, in terms of self-categorization, is the required first step for other identification dimensions to evolve, such as feeling affective ties to the identification target (Bergami & Bagozzi, 2000; van Dick et al., 2004). This is consistent with more general prior research in cognition and emotion which has suggested that cognitive appraisals only trigger emotions when they are recognized as being self-relevant (Lazarus & Smith, 1988). It seems obvious and has been extensively studied that affect can also have reciprocal effects on cognitive processes, including retrieval effects, encoding effects and learning effects (for a review see (Bagozzi et al., 1999)). For the sake of parsimony, a simplified, unidirectional relationship from cognitive to affective identification will be suggested in the present study. In conclusion, cognitive identification is expected to induce affective identification with an innovation.

Hypothesis 11 (H11): The stronger a boundary-spanning member cognitively identifies with an innovation, the stronger he will affectively identify with the innovation.

5.2.6. Affective identification and effort

In parallel to prior theorizing on cognitive identification, affective identification with an innovation is proposed to exert an influence on behavioural and selling performance outcomes. If affective follows cognitive identification, as pointed out above, it is possible that affective identification may partially mediate the effect of cognitive identification on behaviour and performance. When comparing cognitive and affective components of identification, Ouwerkerk and her colleagues suggested that it is the affective component of identification which is most closely related to work-related behavioural outcomes (Ouwerkerk, Ellemers, & de Gilder, 1999). It has been pointed out, though, that their study may have mistaken affective identification for affective commitment which has previously been shown to predict work-related behaviours (van Dick et al., 2004). Although work on different dimensions of identification in organizational settings is still scarce, a few studies in organizational identification have suggested that cognitive and affective components of identification may generally be related to different attitudes and behavioural outcomes for organizational members (for a review see (Riketta, 2005)).

For the specific context of boundary-spanning members, the marketing literature has provided insights into the impact of affect on their behaviour and outcome performance. Badovick and his colleagues found that emotions were important drivers of boundary spanners' intentions to exerting effort (Badovick, Hadaway, & Kaminski, 1992). They measured effort by means of a composite which included aspects of both persistence and intensity dimensions. Their study differs from the present one, though, in assessing emotions about their previous performance and not focussing on emotions toward the object they are expected to represent. Still, their study provided initial evidence within a boundary spanning context which supports the notion that positive emotions can motivate and serve as a psychological driver of effort (Staw, Sutton, & Pelled, 1994). More closely related to the present study, Brown et al. showed that boundary spanners' anticipation of positive or negative emotions related to a certain goal were associated with the amount of effort exerted toward that goal (Brown, Cron, & Slocum Jr., 1997). In summary, it is concluded that affective identification with an innovation will induce boundary-spanners to display effort towards it.

Hypothesis 12 (H12): The stronger a boundary-spanning member affectively identifies with an innovation, the more effort he will dedicate towards the innovation.

5.2.7. Affective identification and innovation performance

In addition to driving certain behaviours, affect has also been suggested to directly influence job performance. Positive emotions have been suggested to influence job performance in at least three ways (Staw et al., 1994): Firstly, emotions may have direct desirable effects on organizational members by enhancing their cognitive functioning (Ashby, Isen, & Turken, 1999). Individuals in positive moods have been shown to be more efficient, faster and more creative in problem-solving (Ashby et al., 1999; Isen & Baron, 1991; Isen, Daubman, & Nowicki, 1987; Isen & Means, 1983). Secondly, it has been suggested that members with positive feelings are more successful in influencing others (Cialdini, 1993) and are more attractive to and supported by others (Coyne, 1976), including co-workers or customers. Thirdly, members with positive emotions also tend to display greater cooperation and altruism (Organ, 1988; Organ & Ryan, 1995) leading to reciprocal support from others inside or outside the organization which may facilitate their job performance (Staw et al., 1994).

Empirical research has found support for a positive relationship between affect and job performance. For instance, meta-analytic reviews confirm that affective states such as job satisfaction of individuals have a direct effect on their job performance (Carr, Schmidt, Ford, & DeShon, 2003). Focussing on affective dispositions of organizational members, several studies demonstrated a positive relationship between positive affectivity and job performance (Cropanzano, James, & Konovsky, 1993; Staw & Barsade, 1993). While these studies focussed on dispositions which are relatively stable, studies into more fluid affective states confirmed their findings. Pleasant affective states were predictive for better job performance (Bartel & Saavedra, 2000; Wright & Cropanzano, 2004). The causal argument leading from affective states to job performance is strengthened by the results of a longitudinal study by Staw and his colleagues (Staw et al., 1994). They showed that the display of

positive affect led to favourable work outcomes as rated by others. Moreover, research has shown that affect can act as an important determinant of boundary spanners' motivation (Badovick et al., 1992; Brown et al., 1997). In a recent study, Miao and Evans (Miao & Evans, 2007) differentiated cognitive from affective dimensions in intrinsic and extrinsic motivation and examined their distinct effects on salespersons' behavioural performance. They drew on Deci and Ryan's work (Deci & Ryan, 1985) who argued that salespersons which intrinsically enjoy their task are rewarded by the opportunity to carry it out. Commensurate with this notion, Miao and Evans found that affective intrinsic motivation positively influenced salespersons' behavioural performance (Miao & Evans, 2007). While these works have shown that affective dispositions or states facilitate individual job performance, Sojka and Deeter-Schmelz (Sojka & Deeter-Schmelz, 2008) recently studied whether using affect, or 'gut feel', as information was related to their selling performance. They studied affective orientation, defined as "*the propensity to use affect as information*" ((Booth-Butterfield & Booth-Butterfield, 1990) p.452). Affective-oriented individuals use their emotions as sources of information and rely on them for judgement during the sales process. Sojka and Deeter-Schmelz found that affective orientation impacted selling performance positively when self-assessed by the salespersons. In short, a large amount of research suggests that having positive affective dispositions and being in pleasant affective states as well as using affect as information enhances individual job performance. When a boundary spanner affectively identifies with an innovation, he has developed a strong emotional attachment to the innovation and assigned positive feelings to his perception of the innovation. In consequence, he will be in a positive affective state when carrying out his external representation role. Drawing on prior research it is thus suggested that such positive affective stance towards the innovation will enhance the selling performance of the innovation.

However, while the above research appears to unanimously point to a positive relationship between affect and job performance, more recent findings question this assertion. For instance, Sojka and Deeter-Schmelz also found that salespersons' affective orientation was unrelated to the salespersons' outcome performance, when a more objective measure was used (Sojka & Deeter-Schmelz, 2008). Not only did the significant association between affective orientation and performance vanish, but the regression coefficient turned negative when the outcome variable was changed

(Sojka & Deeter-Schmelz, 2008). Likewise, while Miao and Evans had found a positive relationship between affective intrinsic motivation and behavioural performance, they discovered a negative association of affective intrinsic motivation when relating it to the salespersons' outcome performance (Miao & Evans, 2007). These findings suggest that affective attitudes are not necessarily a positive driver of performance, but may have a dark side.

Extant psychology research provides several insights as to how affect could be detrimental to performance. For instance, individuals with positive emotions may be less sensitive to the quality of arguments than individuals in negative moods as negative affect requires stronger arguments for persuasion than positive affect (Mackie & Worth, 1989, 1991; Schwartz & Bless, 1991). Similarly, positive affect has long since been viewed as more prone to cognitive biases such as overconfidence, self-serving attribution or illusions of control (Alloy & Abramson, 1979; Kuiper, 1978; Sweeney, Anderson, & Bailey, 1986). In reviewing psychological literature on affect and performance, Cote suggests that it may be contingent on the type of task how positive or negative affect is related to performance (Cote, 1999). The reasoning is as follows: When an individual senses negative affect, it signals to him that he is in a threatening situation. A threatening situation, again, is said to trigger a certain type of information processing which can be characterized as effortful and detail-oriented. A sense of positive affect, however, is said to signal that status quo is acceptable. In consequence, positive affect triggers simple and creative information processing (Cote, 1999). In situations which require effortful and detail-oriented information, negative affect is thus most adequate. In such instances, positive affect can turn out to be detrimental to performance, because it induces inadequately simple and playful processing. Conversely, negative affect may lead to reduced performance when the tasks at hand ask for creativity and novel approaches, because negative affect triggers effortful and detail-oriented information which shuns creativity (Cote, 1999).

A boundary spanner's successful external representation of an innovation arguably requires both types of information processing. On the one hand, detail-oriented information processing is needed when a boundary spanner is attending to the individual customers' needs. Thus, a boundary spanner who strongly identifies with an innovation may approach the selling task with over-confidence. On the other

hand, creativity is helpful when experimenting with new selling approaches (Weitz, Sujan, & Sujan, 1986). In sum, positive affect could be harmful to the performance of the innovation when it biases the boundary spanner's cognitions and inhibits detail-oriented information processing.

In conclusion, it can be said that extant research provides ambiguous theoretical reasoning and empirical results as to the relationship between affect and outcome performance. Hence, a hypothesis is proposed both ways.

Hypothesis 13a/b (H13a/b): The stronger a boundary-spanning member affectively identifies with an innovation, the a) better, b) worse the innovation will perform.

5.2.8. Affective identification and extra-role behaviour

Up to this point, a boundary spanners' effort and the related outcome performance have been linked to affective identification. Effort and selling performance represent aspects of a boundary spanner's in-role behaviour. As laid out before, a boundary spanner may display supportive behaviour beyond what is expected of him due to his role (Van Dyne et al., 1995). It is well-established in social psychology that such extra-role behaviours will be displayed more by individuals in positive affective states than in negative affective states (Isen & Baron, 1991). While most research linking organizational identification with extra-role behaviour has — at least conceptually — adopted a cognitive perspective on identification, there are ample indications from studies on related concepts (such as commitment) that the affective dimension of identification may also be of importance for such behaviours.

To begin with, the study by Ouwerkerk and her colleagues suggested that affects are more closely related to work-related behavioural outcomes than cognitions (Ouwerkerk et al., 1999). Bergami and Bagozzi supported this notion by showing that the related concept of affective commitment mediates the relationship between cognitive identification and citizenship behaviours, a type of extra-role behaviours (Bergami & Bagozzi, 2000). This is commensurate with prior findings by Organ and Ryan and, later, Podsakoff and his colleagues who showed in extensive meta-

analytic reviews that affective commitment was consistently associated with extra-role behaviours (Organ & Ryan, 1995; Podsakoff et al., 2000). Moreover, not only transient affective states, but also relatively stable affective dispositions, e.g. positive affectivity, have been positively associated with extra-role behaviours, including altruism (Podsakoff et al., 2000) or cooperativeness and helpfulness (Cote, 1999). Finally, Becker and Kernan recently showed that affect toward a certain organizational target induced extra-role behaviour towards that target (Becker & Kernan, 2003). In summary, it is proposed that affective identification with an innovation can be expected to induce extra-role behaviours which are directed toward the innovation.

Hypothesis 14 (H14): The stronger a boundary-spanning member affectively identifies with an innovation, the more extra-role behaviour he will display towards the innovation.

The above developed hypothesis were integrated within a single model which is depicted in Figure 5.1

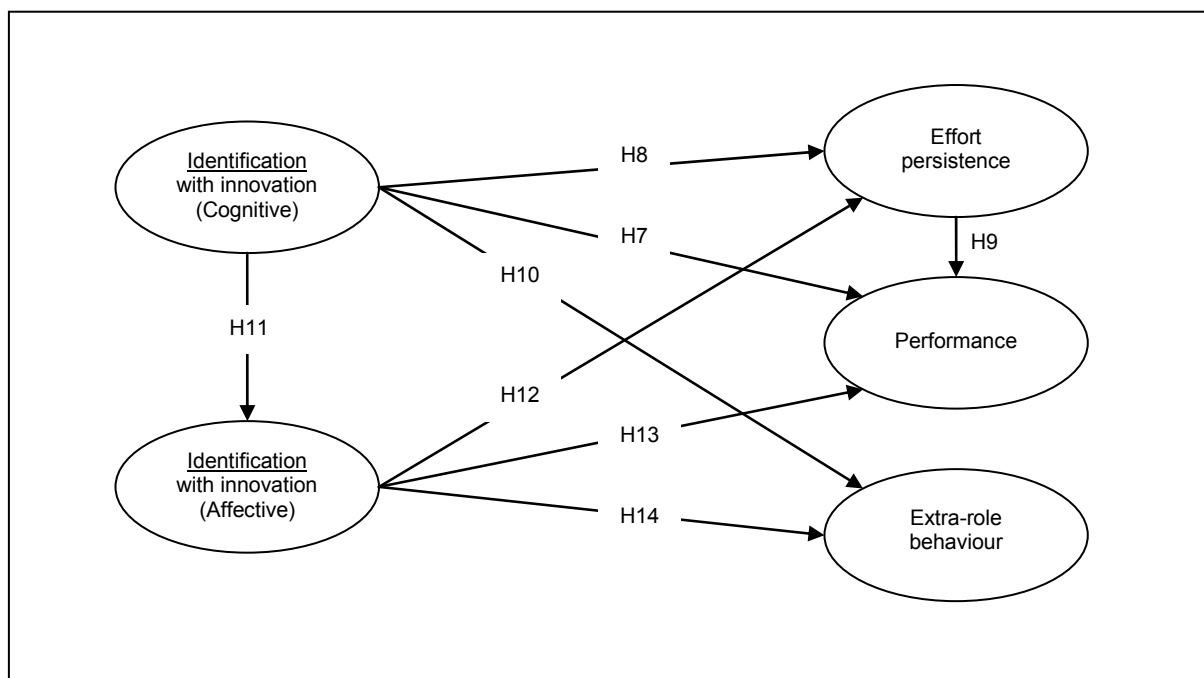


Figure 5.1: Hypothesized model of consequences of identification with innovation

5.3. Methods

5.3.1. Sample and survey

The hypothesized relationships (H7-H14) were empirically tested within the same empirical context as the previous models (H1-H6). Data on behavioural and performance consequences of identification was sourced from company archives and supervisor assessments. The unique opportunity to access such more 'objective' data allowed to create a strong test of the above hypotheses and to avoid the risks of common source bias. Only data on members' extra-role behaviour was not available from company archives and needed to be collected via the survey instrument. This represented no drawback, however, as examining extra-role behaviour via self-assessments is well-established and standard practice in organizational, marketing and psychological research e.g. (Becker & Kernan, 2003; Ehrhart & Naumann, 2004; MacKenzie et al., 1998; Netemeyer & Boles, 1997; Olkkonen & Lipponen, 2006; O'Reilly & Chatman, 1986). The empirical testing of behavioural and performance consequences focused on Inno1 because Inno2 had not yet been launched.

Among the different boundary-spanning roles which exist within an organization, the salesforce was seen to represent an adequate empirical context for three reasons: Firstly, achieving a high level of identification among the salesforce is of premier relevance because the salesforce's contribution is highly critical for the success of the innovation at launch (di Benedetto, 1999) which is, again, key for an innovation's overall performance (Hultink et al., 1997; Hultink et al., 2000; Hultink & Robben, 1999; Kleinschmidt et al., 2007). Secondly, sales representatives clearly embody the external representation function of boundary spanners. Thirdly, HealthCo's salesforce constituted the largest homogeneous group within the organization. Arguably, in most companies the salesforce will represent the largest group of boundary spanners when compared to other boundary spanning roles quoted by Aldrich and Herker (Aldrich & Herker, 1977) such as purchasing agents or personnel recruiters.

5.3.2. Measures and model

Cognitive identification with the innovation

Cognitive identification with an innovation was gauged by Bergami and Bagozzi's measure of self-categorization (Bergami & Bagozzi, 2000) which was described in detail in chapter 3.3.2. As pointed out before, this measure is especially well-suited to the present study, because it limits the assessment of identification to the cognitive dimension and has shown discriminant validity against the affective dimensions of related concepts (Bergami & Bagozzi, 2000). Other widely used measures, such as Mael and Ashforth's scale (Mael, 1988; Mael & Ashforth, 1992), do not offer such discriminant validity, as they are composed of items which not only address cognitive, but also affective or behavioural aspects (Bergami & Bagozzi, 2000). In choosing Bergami and Bagozzi's measure this study concurs with a recent recommendation that viewing identification as congruence of identities may provide a promising way forward that may solve existing challenges in both organizational identity and identification research (Whetten, 2007). As reported in chapter 3.3.2., a verbally modified version, which referred to the innovation as the identification target, yielded a Cronbach's alpha of .92.

Affective identification with the innovation

Items for affective identification were derived from Mael and Ashforth's widely used scale of organizational identification (Mael & Ashforth, 1992) and Ball and Tasaki's well-established self-object attachment scale (Ball & Tasaki, 1992), as several of their items clearly tap the affective domain of identification. Items from Mael and Ashforth's scale included, firstly, "*When someone criticizes [target], it feels like a personal insult*", secondly, "*When someone praises [target], it feels like a personal compliment*" and, thirdly, "*If a story in the media criticized [target], I would feel embarrassed*". The first and third item appeared to be largely redundant as both asked for a personal affective reaction to criticism directed against the target. In consequence, the third item was dropped. Both remaining items were found to run parallel to two items in Ball and Tasaki's scale, including firstly, "*If someone ridiculed [target], I would feel irritated*" and, secondly, "*If someone praised [target], I would feel somewhat praised myself*". Within Ball and Tasaki's original scale, a third item was

found to clearly address affective links between self and an identification target, which was *"If someone destroyed [target], I would feel a little bit personally attacked"*.

The three items of the construct were thus drawn from the best established constructs in identification and related research and slightly adapted in order to form the construct of affective identification with an innovation. Items were measured on scales with five categories, which were anchored at the extremes by 'strongly agree / strongly disagree'. Reliability of the construct was tested and yielded an acceptable coefficient alpha of .74 (Nunnally, 1992). An examination of the item-total correlation revealed that alpha could be raised to .77 by excluding the first item. This was attributed to the fact that the first item captured positive emotions while both others inquired negative emotions towards the innovation. In order to maintain content validity in representing both positive and negative affect toward the innovation, the first item was kept.

Effort

As outlined before, research using subjective, cross-sectional and often retrospective measurements of effort abounds. Hence, this study seeks to measure effort in a more objective way. HealthCo generously granted access to its data archives. This made it possible to capture effort over time by a proxy variable which had been recorded in real-time and could be cumulated for the analysis without incurring potential retrospective biases. Interviews had revealed that — within the empirical context of the present study — effort could be legitimately operationalized as the number of customer visits performed by the boundary spanners throughout the launch phase of the innovation. While HealthCo's sales strategy set certain targets for the minimum expected number of customer visits to be achieved by each boundary spanner, interview partners suggested that variance in effort would be strongly reflected in this proxy variable. Not least, measuring effort in terms of customer visits was deemed to be of special interest to managerial practice, as it promised to contribute insights to the current debate over whether more visits from boundary spanners indeed influence the prescription behaviour of physicians and, thereby, the diffusion of the innovation. The average number of customer visits for the launch period was 186, with a standard deviation of 113.12. Skew and kurtosis of the variable were .06 and -

.36, respectively, which signalled no critical departure from normal distribution (Schumacker & Lomax, 2004).

Innovation selling performance

The empirical assessment of the innovation's selling performance was also based on archival data. The innovation performance measure represents the cumulated sales which a salesperson achieved during the launch of Inno1 within his sales territory. As each territory was served by two boundary spanners during the launch, supervisors were asked to indicate what percentage of the sales within a territory was attributable to each of the two boundary spanner. This percentage was then multiplied with the territory sales to arrive at the innovation sales performance attributable to each boundary spanner. Interviews with the supervisors indicated that this attribution posed no difficulty to them, because they were experienced in assessing their subordinate's selling performance as an inherent and frequent task of regional management. Moreover, each regional supervisor was in charge of only ten boundary spanners and kept contact with each of them and with their customers on a daily basis, which makes their assessment appear trustworthy. Finally, even though informational, cognitive or affective constraints may exert a certain influence on supervisor's appraisal of their subordinates' performance (Campbell & Lee, 1988), supervisor ratings have proven to be solid measures of sales performance of boundary spanners (Brown & Peterson, 1994; Churchill Jr. et al., 1985; Landy & Farr, 1983).

For reasons of confidentiality, the sales performance measure was expressed in relative terms by dividing each boundary spanner's sales performance by the average sales performance of all boundary spanners. The resulting innovation performance measure thus denoted the extent to which a boundary spanner's success in selling Inno1 over- or underperformed the average innovation performance achieved by all HealthCo boundary spanners. Innovation performance was characterized by significant variation between boundary spanners, with the lowest relative innovation performance only reaching 18% and the highest achieving as much as 331% of the HealthCo average. The average sales performance (1.0) had a standard deviation of .51. Skewness was below the threshold of +/- 1.5, but

kurtosis exceeded it. A natural logarithm transformation was performed on the absolute sales data. Prior to the transformation the original sales data was linearly transformed by an unpublished factor in order to maintain confidentiality of the real sales data. This transformation significantly improved both skewness and kurtosis to fall below threshold levels. In addition, a Kolmogorov-Smirnoff and a Shapiro-Wilk test were performed yielding insignificant statistics of .07 ($p=.2$) and .99 ($p=.14$), respectively, which indicated that normality of the innovation performance data had been achieved.

Extra-role behaviour

Extra-role behaviour has often been measured by differentiating it into sub-dimensions including altruism, courtesy, conscientiousness, sportsmanship, civic virtue and loyal boosterism (Becker & Kernan, 2003; Bergami & Bagozzi, 2000; Ehrhart & Naumann, 2004; Konovsky & Pugh, 1994; MacKenzie et al., 1998; Organ, 1988; Organ & Ryan, 1995). As the focus of the present study was to gauge the overall extra-role behaviour of the boundary spanners towards the innovation instead of achieving a detailed analysis of its sub-dimensions, items were formulated in a way which captured the conceptual domain as comprehensively as possible. Following VanDyne's definition (Van Dyne et al., 1995) given above, extra-role behaviour is characterized by two critical aspects. Behaviours are 'extra-role', firstly, when individuals engage in them voluntarily and, secondly, when the actions taken are not prescribed within their role.

Boundary spanners at HealthCo confirmed in interviews that there were several different ways by which they could engage in extra-role behaviour in order to support the innovation. Three items were formulated to capture these aspects, that is, to what extent individuals would exert supportive behaviour toward the innovation beyond the call of duty and on a discretionary basis. Items were, firstly, "*I have engaged in voluntary actions for Inno1 which went beyond my usual tasks as a sales representative*", secondly, "*I have done more than I was expected to by the organization, in order to put Inno1 onto a successful path*", and thirdly, "*For Inno1, I have voluntarily delivered extra-effort*". The pre-test of the survey instrument did not suggest that the items were plagued by ambiguity. An exploratory factor analysis

indicated that all items loaded on a single factor, explaining 73% of its variance with all item loadings exceeding .70 (Churchill, 1979; Gerbing & Anderson, 1988). The solid reliability of the extra-role construct was confirmed by its coefficient alpha which reached .89.

Controls

Standard demographic and other controls related to boundary spanners' behaviour and selling performance were included. These were age, tenure, level of education as well as a factor to account for regional market differences. As in previous models, age and tenure were allowed to covary freely in order to account for their previously uncovered differences.

Assessing the measurement model

Discriminant validity of the affective identification construct was established through confirmatory factor analyses (CFA). As laid out in chapter 4.4., full information likelihood estimation (FIML) (Arbuckle, 1996) was used as recommended in situations of missing data (Enders & Bandalos, 2001; Wothke, 2000). Absolute and incremental global indices revealed a good fit of the overall measurement model with $\chi^2/df=1.37$ ($p=.08$), RMSEA=.05, CFI=.98, TLI=.96 and NFI=.94. An assessment of partial fit indices provided further evidence of convergent and discriminant validity of the construct. Indicator reliabilities of all items exceeded .40 as recommended. As expected and previously discussed, the only item with low indicator reliability was the positively worded item for affective identification. It had been kept for content validity reasons. Construct reliabilities were solid, all surpassing the recommended threshold of .70. Also, the constructs appeared to be well represented by their items, as those captured more than half of the constructs' overall variance (Fornell & Larcker, 1981). Finally, in comparing the construct's average variance extracted with the square of its largest correlation with any other construct, a strong test of discriminant validity was applied. The largest Fornell-Larcker-Ratio attained .46, and so remained well below the threshold of 1.0. In sum, convergent and discriminant validity could be established for all constructs.

5.4. Results

A structural equation model was run including all constructs and using full information maximum likelihood estimation (FIML) as implemented in AMOS 6.0 (Arbuckle, 1996). Mean values, standard deviations and correlations of all variables are provided in table 5.1.

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9
1. Age	4.92	1.88	-								
2. Tenure at organization	8.06	6.55	.75 ***	-							
3. Education (graduate+=1)	.41	.49	.12	.06	-						
4. Regional sales factor	.98	.22	.04	.04	-.03	-					
5. Cognitive identification with Innovation	5.79	1.34	.02	-.13	.03	-.01	(.92)				
6. Affective identification with Innovation	3.83	.90	-.18 *	-.22 **	.15 †	-.06	.52 *** (.74)				
7. Effort persistence	186.37	113.11	.18 *	.26 **	.13	.08	.04		-		
8. Innovation selling performance	10.78	.46	.14 †	.15 †	-.03	.46 ***	.20 *	-.10	.22 **	-	
9. Extra-role behaviour	3.82	.90	.03	-.02	-.12	-.08	.39 ***	.27 **	.08	.10	(.89)

n=154. Reliability measures (Cronbach's alpha) are on the diagonal.

†p ≤ .10; *p ≤ .05; **p ≤ .01; ***p ≤ .001

Table 5.1: Descriptive statistics and correlations

Results indicated a good fit for the hypothesized path model with $\chi^2/df=1.27$ ($p=.07$), RMSEA=.04, CFI=.98, TLI=.97 and NFI=.91. In order to further verify whether identification with the innovation influences in-role, innovation and extra-role behaviour or vice-versa, a model with reciprocal causation among the two identification variables and all performance variables was tested. The chi-square difference statistic between the hypothesized and the reciprocal model indicated that the reciprocal model did not fit the data significantly better than the hypothesized model ($\chi^2_{df}=5.705$, $df=6$, $p>.1$). As including reciprocal paths made the model non-recursive, a stability index for all variables was calculated (Bentler & Freeman, 1983; Fox, 1980). Fox's stability index was .74 and the model could thus be seen as stable (Fox, 1980). It was concluded that identification primarily influences the different performance variables and not the other way around.

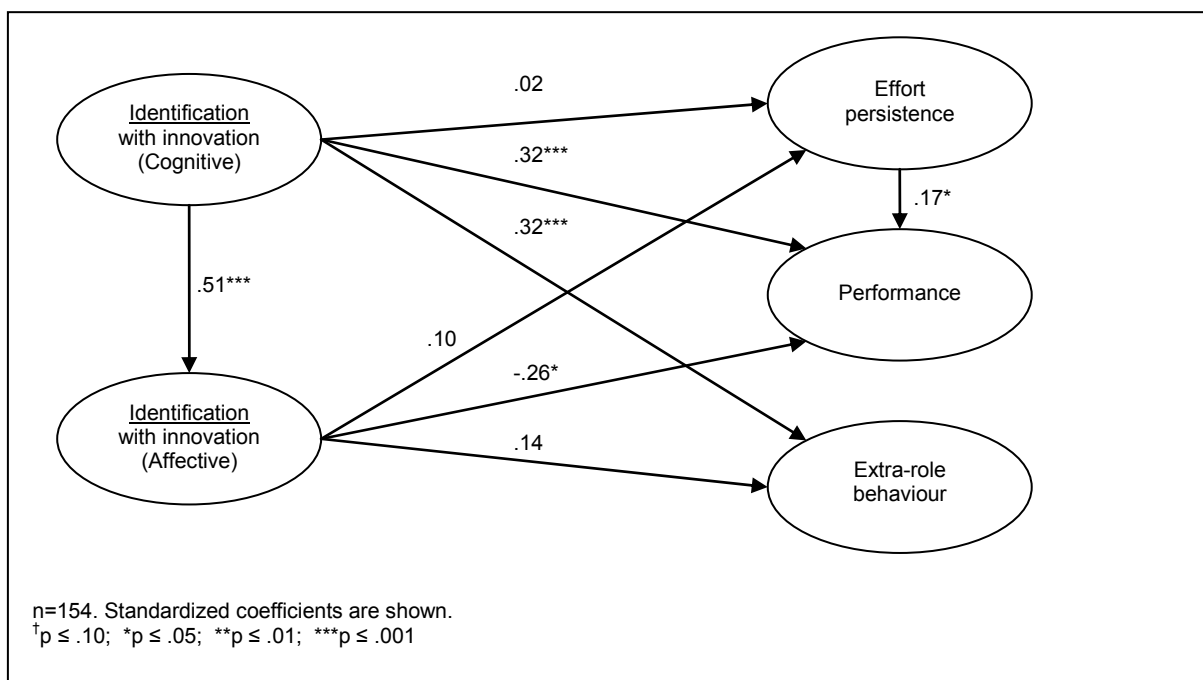


Figure 5.2: Consequences of identification with innovation (only main effects shown)

Cognitive identification with the innovation was significantly related to its selling performance in a strong and positive way ($\gamma=.32$, $p<.001$). Thereby, empirical support was found for the main performance hypothesis which stated that a boundary spanner's cognitive adoption of an innovation is strongly predictive for the innovation's success in the market (H7).

The path coefficient from cognitive identification to effort was very weak and did not reach significance. This was true whether the direct path from identification to performance was freed ($\gamma=.02$, $p=.80$) or restricted to zero ($\gamma=.03$, $p=.77$). Apparently, the data did not support that identifying with an innovation leads boundary spanners to devote more effort in its promotion, as measured in number of sales calls. Based on the present data, H8 would have to be rejected. These results have to be considered with caution within their empirical context, as will be explained in detail in the discussion section.

A boundary spanner's effort was found to be predictive for the performance level of the innovation ($\gamma=.17$, $p<.05$). Thus, evidence was found in support of H9. Taken together, results concerning H8 and H9 indicate that a boundary spanner's effort as measured by the number of sales calls does not mediate the relationship between identification and performance. Still, the number of sales calls made for an innovation appears to significantly influence its performance. Again, the validity of this conclusion will be examined in more detail in the discussion section.

A member's extra-role behaviour was found to be clearly related to his cognitive identification with the innovation. Boundary spanners who cognitively identified strongly with an innovation tended to display significantly more extra-role behaviour towards it ($\gamma=.32$, $p<.001$) than those who did only weakly cognitively identify with the innovation. Thus, H10 was supported.

Results concerning the affective dimension of identification confirmed some findings from the cognitive dimension, but also yielded some intriguing contrasts. To begin with, the close relationship between the two dimensions was confirmed. H11 postulated that a boundary spanner's cognitive identification should be predictive for his level of affective identification with an innovation. Results provided solid support for this hypothesis ($\gamma=.51$, $p<.001$). A test of reciprocal causality between cognitive and affective identification led to no significant reduction of the chi-square statistic ($\chi^2=.322$, $df=1$, $p>.10$).

Moreover, commensurate with findings from cognitive identification, affective identification was found not to be related to the amount of effort exerted towards the innovation in terms of customer visits ($\gamma=.10$, $p=.36$). Thus, no support was found for hypothesis 12 (H12). Again, this results needs to be interpreted with caution as will be laid out in the discussion section.

Astoundingly, though, in contrast to cognitive identification, a stronger affective identification could not be related to a better performance of the innovation as hypothesized (H13a). On the contrary, the more a boundary spanner affectively linked himself to the innovation, the more detrimental it was to the selling success of the innovation ($\gamma=-.26$, $p<.05$). These findings provided support for hypothesis 13b (H13b) and stand in stark contrast to results from cognitive identification which was found to be clearly positively related to innovation performance. Affective identification, then, cannot be regarded as a simple mediator between cognitive identification and innovation performance, but appears to be of separate, significant influence for the selling performance of an innovation.

Finally, while cognitive identification was found to be clearly associated with extra-role behaviour towards the innovation, affective identification was not. The relationship was weak and not significant ($\gamma=.14$, $p=.23$). Thus, the data did not support the notion that an emotional adoption of the innovation induces boundary spanners to support it beyond the call of duty (H14).

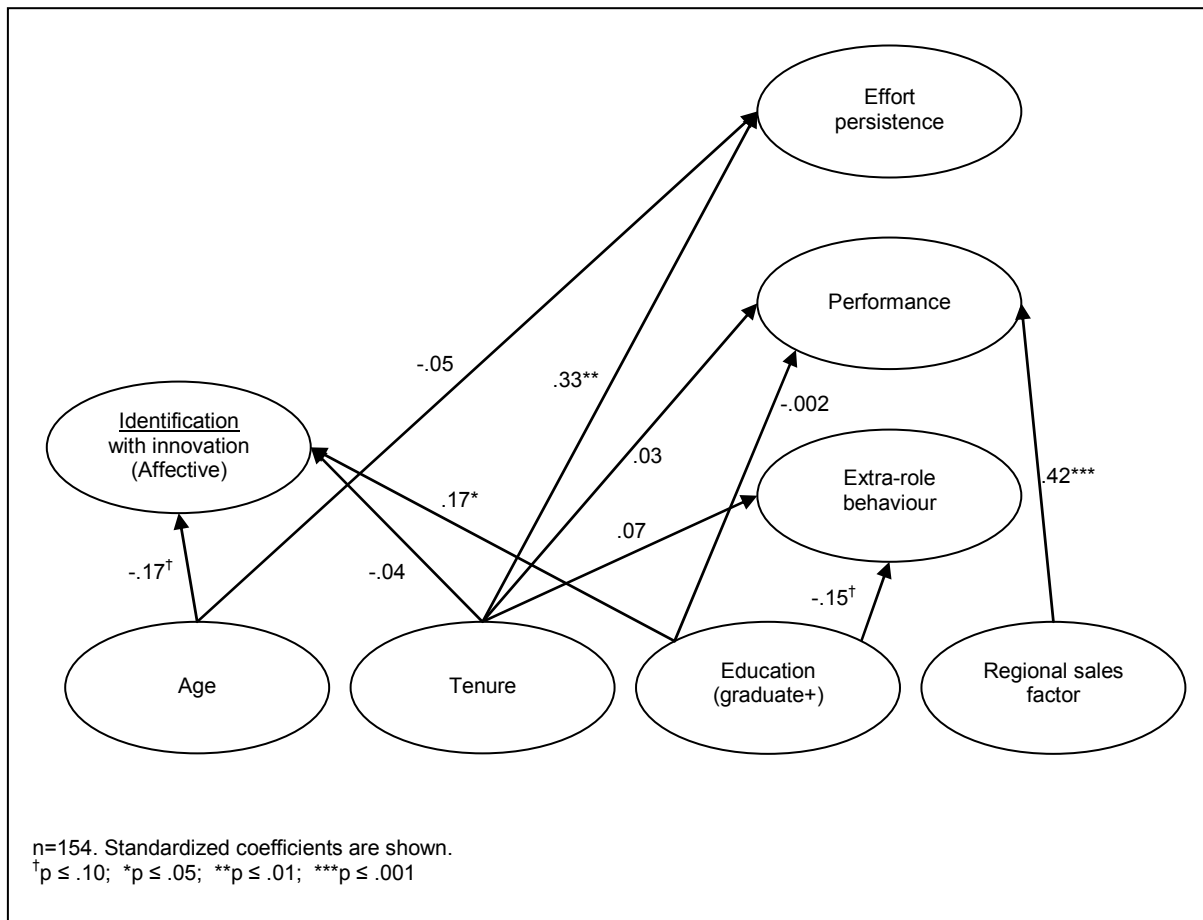


Figure 5.3: Consequences of identification with innovation (only controls shown)

The controls and all of their associations with other variables are depicted in figure 5.3. They contributed some additional, interesting findings that should not go unnoticed. Age was found to be weakly negatively related to a boundary spanner’s affective identification with the innovation ($\gamma = -.17$, $p < .1$, one-sided). Older boundary spanners thus tended to have a less emotional link between their self-concept and the innovation than their younger colleagues. Age was not found to be predictive for a boundary spanner’s in-role performance, as measured by the number of his customer visits. The negative direction of the path coefficient was in line with expectations, but only very weakly so and falling far short of significance ($\gamma = -.05$, $p = .65$). It appears that boundary spanners of higher age did not dedicate significantly less effort in promoting the innovation than their younger counterparts.

Similarly to age, tenure was found to be unrelated to affective identification ($\gamma = -.04$, $p = .32$, one-sided). In contrast to age, however, tenure made a difference for effort. Boundary spanners who had been working at HealthCo for a longer time, also made significantly more sales calls for the innovation ($\gamma = .33$, $p < .01$, one-sided). In parallel to the findings described in chapters 3.4. and 4.5., these results again confirm that differentiating age and tenure may be important for understanding boundary spanners' cognitions and behaviours towards innovations. As to the remaining performance variables, tenure showed neither a significant relation to innovation performance ($\gamma = .03$, $p = .33$, one-sided), nor to extra-role performance ($\gamma = .07$, $p = .23$, one-sided).

The educational control variable yielded unexpected and somewhat controversial results. First, a higher educational level was found to be weakly but significantly related to affective identification ($\gamma = .17$, $p < .05$, one-sided). Boundary spanners with educational backgrounds reaching graduate levels and beyond more strongly identified affectively with the innovation than those with lower educational backgrounds. Second, innovation performance appeared to be independent of the boundary spanners' educational level ($\gamma = -.002$, $p = .49$, one-sided). Extra-role behaviour, however, was significantly predicted by the educational background of the boundary spanner, though in a negative way ($\gamma = -.15$, $p < .05$, one-sided).

Controlling for regional influences on innovation performance revealed that regions were not equal. The relative differences in regional sales of the innovation — as measured by the regional sales factor — had a strong influence on the sales performance of the innovation ($\gamma = .42$, $p < .001$). The strength of regional differences came as a surprise because regions had been explicitly tailored by HealthCo management to represent equivalent potentials prior to the launch of the innovation. However, interviews with boundary spanners had cautioned that regional sales may still differ systematically in terms of market potential. It was fortunate that access to comprehensive data covering the complete sales organization as well as the corresponding markets allowed for the computation and inclusion of regional differences. Without an opportunity to comprehensively control for this important

environmental effect, the cognitive and behavioural determinants of innovation performance may not have been uncovered. Table 5.2. summarizes the results as they relate to the hypotheses of this chapter.

Hypotheses		Findings
Cognitive identification with the innovation		
H7:	Cognitive identification with innovation →	Performance of innovation (+) supported
H8:	Cognitive identification with innovation →	Effort towards innovation (+) not supported
H9:	Effort towards innovation →	Performance of innovation (+) supported
H10:	Cognitive identification with innovation →	Extra-role behaviour towards innovation (+) supported
Affective identification with the innovation		
H11:	Cognitive identification with innovation →	Affective identification with innovation (+) supported
H12:	Affective identification with innovation →	Effort towards innovation (+) not supported
H13a:	Affective identification with innovation →	Performance of innovation (+) not supported
H13b:	Affective identification with innovation →	Performance of innovation (-) supported
H14:	Affective identification with innovation →	Extra-role behaviour towards innovation (+) not supported

Table 5.2: Findings for hypotheses H7-14

5.5. Discussion

Theoretical implications

The present study set out to develop more fine-grained insights into the adoption of innovations by boundary spanners, as well as the consequences of adoption in terms of behaviour and outcome performance. In order to achieve this goal, the study resorted to insights from (social) psychological research on identification and related concepts which were then extended and applied to innovations as targets of identification. The present work’s main contribution to the extant literature is thus twofold: Firstly, this chapter represents the first study which explores behavioural and performance consequences of the previously developed, novel concept of members’ identification with innovations. Secondly, it develops a novel perspective on boundary spanners’ adoption of innovations which — for the first time — theoretically and empirically distinguishes cognitive, affective and behavioural elements, explores their relationships and shows their distinct effect on an innovation’s market performance. Results evidence that this approach is fruitful and yields novel insights that may not have been uncovered in less differentiated analyses of attitude formation. Three major conclusions can be drawn from the present results.

First, cognitive and affective dimensions of identification were found to have different effects on behaviour and outcome performance, which stresses the importance of differentiating these two dimensions within the process of adoption. Innovation-related extra-role behaviours and selling performance were clearly positively associated with cognitive identification. Affective identification, however, did not show the same relation to extra-role behaviour and was even significantly negatively related to innovation performance. These insights could only be found by cautiously discriminating the cognitive from the affective dimensions of attitude formation towards innovations and modelling their interrelation. Mixing these dimensions of identification within a single construct — like prior research has done, e.g. (Atuahene-Gima, 1997; Hultink & Atuahene-Gima, 2000) — would have masked their effects, leading to faulty conclusions. The results thus respond to and affirm prior calls to develop a more differentiated understanding of members' attitude formation because it may be highly relevant for understanding and managing members' resistance of innovative change (Piderit, 2000) as well as boundary spanners' motivation and job performance (Miao & Evans, 2007)

Second, in contrast to prior research outlined above, this work developed an understanding of boundary spanners' innovation adoption which is consistent with Roger's widely established definition of adoption (Rogers, 1983). Boundary spanners' adoption of innovations was here proposed as a purely internal, cognitive and affective, individual-level process: In contrast to Anderson and Robertson's conception (Anderson & Robertson, 1995), performance outcomes were not included in, but distinguished from the notion of adoption because performance outcomes are not only influenced by internal but also by external factors. Outcome performance and its external influences were rather suggested to be elements of the diffusion process of an innovation. The present study thus contributes a consistent adaptation and refinement of Gatignon and Robertson's model of innovation adoption and diffusion (Gatignon & Robertson, 1985) from a consumer to a boundary spanning context.

Thirdly, and certainly not least, this study represents one of the few works elucidating the importance of boundary spanners' external representation function for innovation

success. While boundary spanners' role in gate-keeping and internal promotion through the transfer and sharing of information has been widely researched and deeply understood, their role in externally supporting the innovation has largely been ignored in innovation research up to this point. This study shows that boundary spanners have to be considered as the first target audience which must come to adopt a company's innovations — if they are to be successful. The empirical data proved that even within the same organization there can be a large variance across boundary spanners' identification with the same innovation. It should be noted again, that these attitudinal dispositions among boundary spanners were able to explain up to 30% of the innovation performance differences in the market, after controlling for factors which were mostly not under managerial discretion. This study clearly evidences that innovation success or failure starts 'at home'.

Limitations and future research

Findings and conclusions need to be considered in light of the study's theoretical and methodological limitations. The study theoretically derives and proposes a unidirectional causal relationship from identification to behavioural and performance consequences. However, it is easily conceivable that these concepts are linked in a reciprocal way. For instance, experiencing the success or failure of an innovation, or investing significant amounts of effort towards and innovation's success could certainly feed back and modify initial levels of identification with the innovation. By calculating alternative models with inverted causalities, confidence was sought that the hypothesized direction represents the underlying data best. However, due to the cross-sectional nature of the data, causalities cannot be conclusively postulated. Further theoretical and empirical research is needed to clarify this relationship. Also, the theorized hypotheses were only imperfectly captured by the study's design. While some dependent variables had been recorded in real time and were extracted from archives, the identification antecedents had to be captured in retrospect. This may have introduced a potential for systematic up- or downward bias, depending on the level of identification at the time of the survey. As the theoretical propositions carried a relatively high degree of novelty, a cross-sectional approach appeared sufficient as a first test for their validity (Spector, 1994). As the study delivered rich evidence for many aspects of the proposed model, a next valuable step may consist in devising a more sophisticated design which may be capable of establishing causality. Towards

that end, future research may work with longitudinal data on identification as well as behavioural and performance outcomes. Also, while the study achieved to explain about 30% of the innovation's outcome performance variance, this means that more than two-thirds of its variance remained unexplained. It may be worthwhile to design more comprehensive models including additional antecedent variables which were shown to be related to selling performance in previous works on boundary spanners.

Moreover, some of the individual constructs were subject to limitations. For instance, effort was quite narrowly measured by the number of customer visits performed by each boundary spanner during the launch phase. While this measure represented an interesting opportunity in capturing effort persistence on the basis of archival data as objectively as possible, it cannot be argued to have comprehensively captured all of effort's dimensions. For example, the important dimension of effort intensity was not captured by this study's effort measure. It may thus be possible that identification antecedents are strongly related to effort intensity. Future research could attempt a more comprehensive assessment of boundary spanners' display of effort towards innovations and its relationship with their cognitive and affective identification with innovation. In addition, while the data on innovation performance was sourced from company archives at the territory level, supervisor assessment was necessary to attribute it correctly to each of the two boundary spanners which had been externally representing it within their territory. While supervisor ratings are frequently encountered in studies of boundary spanners' performance, such assessment may not be free of halo effects. For instance, positive affectivity of subordinates has been shown to positively bias performance evaluations (Cardy & Dobbins, 1986; Smither, Collins, & Buda, 1989). Moreover, the assessment of extra-role behaviours based on self-reports has been criticized for being plagued by subjective differences in understanding what constitutes 'in-role' vs. 'extra-role' behaviours (Organ, 1997).

Finally, the empirical setting also had some notable limitations. While the proposed relationships were formulated in view of innovations in general, they were only tested in a single industry. It may be possible that the external representation function is more closely tied to the identification antecedents and behavioural and outcome performance consequences in Healthcare than in other industries. Moreover, the study was also limited to the assessment of a single type of product. A single

industry, company and product were explicitly chosen because working within a 'controlled' environment was seen as crucial to uncovering psychological differences. Future research could assess multiple products across different firms and industries in order to additionally solidify and extend the present findings.

6. Managerial Implications: A Toolkit for Innovation-Identity Management

6.1. Overview

The above studies yield managerial implications for at least three different realms of the innovation management practice. Firstly, it provides decision makers with an enhanced *understanding* of the social psychological ramifications of their firms' innovative actions. This study clearly proposes that the notion of identity needs to be recognized as an important element in innovation management. Secondly, this study also proposes an extension of the *strategic analysis* of innovative actions. The specific mechanisms suggested in the above studies allow for the development of identity-based portfolio matrices which can be used in strategic decision-making. Thirdly and finally, the present study allows to derive specific recommendations as to how innovative actions can be *communicated* within an organization in order to achieve strong identification of organizational members with the innovations.

The three areas of managerial implications are discussed in the following chapters in sequential fashion. After the studies' findings are summarized for an enhanced managerial understanding of innovations in the upcoming chapter, the next section shows how these insights can be translated into tools for strategic analysis and decision-making. Once decisions have been taken, they need to be effectively communicated. This is addressed in the last section of this chapter by showing how the present findings can contribute to setting up successful communications for innovative actions.

6.2. Understanding innovations: A new framework

The present work clearly refutes the idea that it is an individual's traits which determine whether he is positively or negatively disposed toward his organization's innovative actions. Rather, the results show that large parts of members' differences in identifying with innovations depend on their perception of the specific innovation. This is good news for management, because perceptions can be managed (for a recent review of perception management see e.g. (Elsbach, 2003b)).

The most important fundamental insight from the *first* study (chapter 3) is that members should not simply be viewed as ‘resisting’ or ‘favouring’ novelty, but rather as identifying more or less with innovative actions depending on whether they understand them as positively or negatively contributing to their sense of self as organizational members. Results showed that it is of critical importance to members how the innovation is going to affect the organization’s distinctiveness, its congruence and its prestige, because this appeals to their sense of self-distinctiveness, self-continuity and self-enhancement.

From the *second* study (chapter 4), a deeper understanding can be gained as to how exactly members perceptually link an organization’s innovations with its identity. It shows that innovations are consciously or unconsciously evaluated by the organizational members as to how representative they are for the organization’s ideals. Not all innovations are imbued with the same degree of such prototypicality, though. Rather, innovations are seen to be highly prototypical for the organization when they appear to support the organization’s distinctiveness, congruence and prestige. It is well established in cognitive psychology that elements within cognitive categories all have a graded structure of prototypicality. Thus, if organization function as cognitive categories, the prototypicality principle should be applicable not only to innovations but to intraorganizational elements as diverse as the organization’s strategies, processes or assets. Prototypicality is not merely a theoretical construct with no implication beyond academic thought. Rather, it explains more than half of the employee’s identification with an innovation. It clearly follows that if executives want to motivate their workforce to align behind an innovation and propel it to success, they need to first develop an understanding of the extent to which innovations will be viewed as representing the organization’s ideals. This assessment needs to be performed before any official internal announcement, let alone external launch of an innovation.

The third study (chapter 5) dealt with the consequences of members’ identification with innovations and arguably contains the most direct and tangible managerial implications. Findings evidence the importance of leading boundary-spanning organizational members to identify with the innovation. In view of the fact that identification explained about a third of the selling performance of the innovation,

identification management may be one of the single most critical factors for successful innovation management. Besides driving innovation performance, identification also encourages organizational members to go beyond the call of duty when promoting the innovation. Highly identified members support the innovation even if they personally do not benefit from their efforts. As the introduction of innovations can often be quite turbulent, such readiness of the workforce to flexibly adapt and help out can represent an invaluable competitive advantage. A key recommendation, then, is that executives should strive to achieve cognitive identification with the innovation among the workforce.

The study also showed that members who cognitively identify often develop emotional bonds with the innovations as well. Although both types of identification are positively correlated with each other, they differ as to their consequences. While cognitive identification is positive for extra-role behaviours and innovation performance, affective identification is negative. On the one hand, then, executives should support their members' perception that the innovation fits their organizational identity ideal well and is thereby similar to their image as organizational members. On the other hand, executives should be wary of generating an emotional attachment between the organizational members and the innovation. Members should *understand* that an innovation fits their self-concept well, but not *feel* too strongly about it in a vicarious manner. As cognitive identification is a prerequisite for, and often leads to, affective identification, it is clear that creating cognitive identification without engendering its affective counterpart will be a challenge.

Another finding — unrelated to identity and identification — may be of interest to management practice specifically in the pharmaceutical industry. When sales representatives displayed persistent effort as measured by the number of visits they made to new customers, higher sales figures were achieved for the innovation. Apparently, when sales representatives have a higher number of meetings with physicians, this is beneficial to the innovation's performance. It is important to note, though, that the studies did not assess whether the visits were made to many different physicians or repetitively to the same. Interviews indicated that targets for the number of visits per physician should not be raised too high, because such

strategies can rebound in tiring or even upsetting the customer, thereby creating a negative disposition toward the firms' innovations and products in general.

In conclusion, executives need to understand how their organization's innovative actions are linked to their organization's identity and that this relationship can either become a catalyst or a fatal stumbling block to innovation and organizational success.

6.3. Analyzing innovations: A new strategic management tool

6.3.1. Developing an Innovation-Identity-Matrix (IIM)

If the previous section advocated an extended understanding of innovations, the present section builds on these insights and derives a management tool which allows for a systematic assessment of the identity-innovation relationship. The tool consists of a portfolio matrix which relates the perceived characteristics of innovations to the organizational identity and is called an identity-innovation-matrix (IIM) (see figure 6.1.). The IIM analyzes to what extent the innovation portfolio supports the ideals which the workforce cherish for their organization. It thus allows for the integration of identity aspects into strategic innovation decisions and can help to secure employee identification with the innovation and the organization.

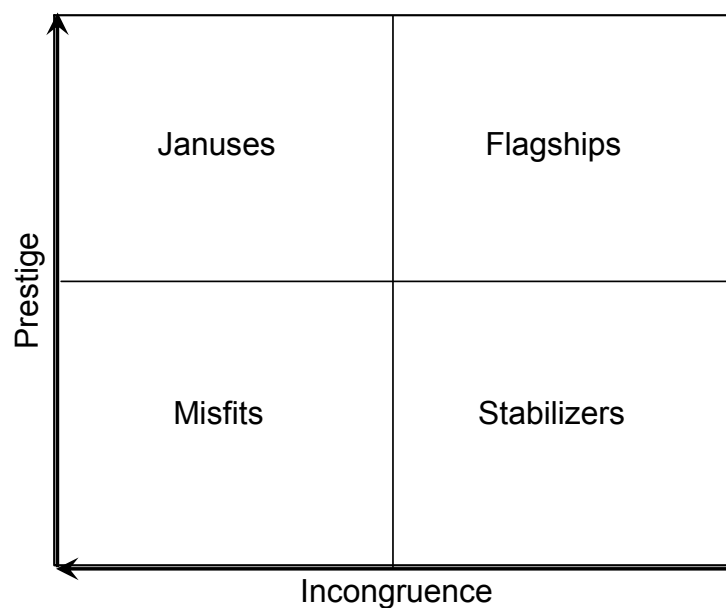


Figure 6.1: The Identity – Innovation Matrix (IIM)

When constructing the IIM, several key steps need to be observed as with any portfolio matrix (Wind, Mahajan, & Swire, 1983). First, the level and unit of analysis need to be established. An IIM can be constructed for any substantive innovative organizational action. In the present studies, an organization's past and current product innovations represent the relevant units of analysis. They are being studied at the organizational level, because the focal organization is composed of one dominating strategic business unit (SBU). However, when assessing an organization

with several important SBUs, an IIM should first be constructed for each SBU. In organizations with holographic identities, results should be similar whether studied at SBU or organizational levels. In organizations with ideographic identities, though, aggregation from SBU to organizational level may not be warranted, because identities may significantly differ in content between both levels. As a general rule, the level should be chosen at which management seeks to assess and manage employee identification.

Secondly, the relevant matrix dimensions have to be identified. An IIM is constructed in order to provide insights into how an organization can manage its innovation portfolio so that the employees' identification with the innovation and the firm is strengthened. Thus the dimensions of the IIM should reflect the factors which are of highest relevance to members' identification with the innovations and the organization. The above studies have provided ample evidence that an innovation's perceived incongruence and prestige effects exert the strongest influence on the members' level of identification. Hence, they are chosen as the two dimensions of the matrix. Selecting these two dimensions is also in keeping with the standard practice of combining an internal and an external dimension when constructing product portfolio matrices (Wind et al., 1983). While the assessment of an innovation's incongruence effect involves purely internal aspects of the organization, the evaluation of an innovation's prestige effect relates to the external image of the organization — as construed by organizational members. Both dimensions represent single, measurable criteria and are not composed of further sub-dimensions. A third dimension can be included into the analysis by differentiating the size of the bubbles which denote the innovations in the matrix. The content of this third dimension can be chosen flexibly, depending on the special goal of the analysis.

Thirdly, the dimensions' relative importance and boundaries need to be determined. As the empirical studies showed that both dimensions are of approximately similar weight and significance for the members' identification with innovations and organization, they are given equal weight in the IIM. Setting the values for the matrix boundaries represents a critical decision. Two approaches can be differentiated. In the absolute approach, the full scale of both dimensions is represented by both axes. This approach is recommendable when the goal is to compare different portfolios,

e.g. stemming from different SBUs. A different, relative approach can be insightful when only a single portfolio is under assessment (as in the present studies) and only the comparison between the products within the portfolio is of interest. For a relative IIM, upper and lower boundaries of the axes are determined by taking the highest and lowest value of any innovation within the portfolio on that axis. The boundaries can then be extended by a certain margin in order to ensure that the product innovation 'bubbles' are represented within the matrix. This equals the frequently used rule of taking the sample mean as the cut-off point for dividing matrix dimensions into 'low' and 'high' categories (Wind et al., 1983).

Fourthly, with respect to parsimony the IIM is constructed in the simplest possible matrix format (2x2). The resulting quadrants are then examined, first in a static, then in a dynamic way (see figure 6.1.).

- **Misfits:** The lower left quadrant contains innovations which are perceived to highly contribute to internal organizational incongruence and to add little to the externally construed organizational prestige. Such innovations can rightly be called misfits as they appear not to fit the organization on its path towards the ideal organizational identity. Members will be expected not to identify, or to actively disidentify with misfits.
- **Januses:** The upper left quadrant is home to innovations whose evaluation is ambiguous. On the one hand, members see them as detrimental to their organization's *internal* congruence, while recognizing on the other hand that the same innovations may be supportive for the organization's *external* prestige. This situation can arise whenever organizational members think that the external constituents' ideals for their organization differ from their own. Januses will thus only receive medium levels of identification or an ambivalent form of identification from organizational members.
- **Flagships:** Innovations in the upper right quadrant are seen as raising the prestige of the organization in a direction which is highly congruent with the ideal organizational identity while also garnering external prestige at the same time.

These innovations symbolize to their members what the organization wants to stand for and so members highly identify with such 'flagships'.

- **Stabilizers:** Innovations in the lower right quadrant are perceived as not doing much for the organization's external image. Still, because they appear to be congruent with the ideals of the organization, they contribute to the organization's portfolio in a positive way. The more of these congruent innovations are represented within an organization's portfolio, the less any incongruent innovation will be able to destabilize members' impression that the organization is headed in the right direction. Innovations in the lower right quadrant are thus called stabilizers and members are expected to display a medium degree of identification with them.

Classic portfolio approaches are not only used to assess the positioning of the product portfolio at a certain point in time, but are also applied to predict the movement of products between different quadrants over time. Among the better approaches, predictions of dynamics within the matrix are grounded in underlying logics such as the experience curve, the product lifecycle or changes in the market environment (Wind et al., 1983). While these classic approaches deal with substantive and quite objective features of innovations and their market environment, the present IIM approach markedly differs in strictly focussing on subjective matters such as perceptions and images. However, the underlying dynamic logic for the IIM still runs somewhat parallel to the logics in classic portfolio management approaches. More specifically, just as the lifecycle drives dynamics within classical portfolio approaches, a sensemaking cycle determines the innovations' paths within the IIM. This sensemaking cycle is depicted in figure 6.2. and subsequently laid out in further detail by drawing on theoretical developments, which were delineated in chapter 4.

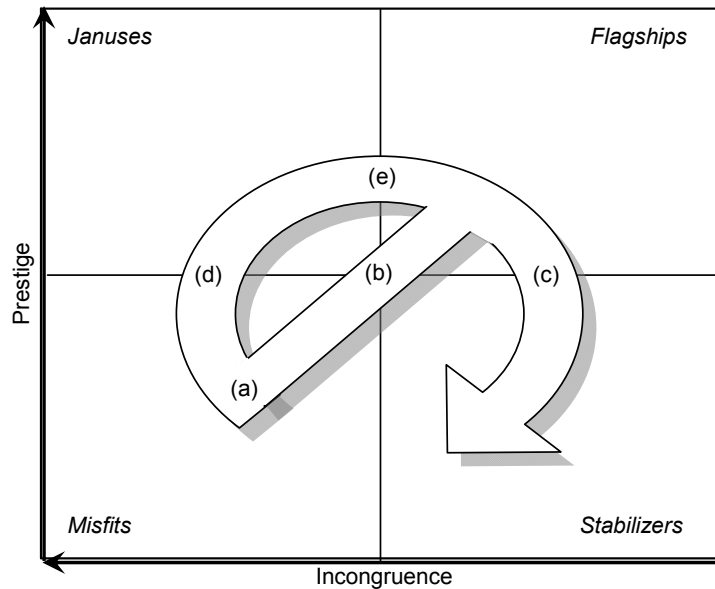


Figure 6.2: The sensemaking cycle within the Identity – Innovation Matrix (IIM)

As explained earlier, the definition of innovations as novel organizational elements entails that, upon announcement, innovations are necessarily perceived to be somewhat different from all other organizational elements. An innovation, thus, always starts off by creating a certain level organizational incongruence, because its fit is simply unclear. In addition, the novelty characteristic of an innovation also implies some uncertainty as to how it will be received by the environment and how the prestige of the organization will be impacted because of it. In short, when an innovation comes to the attention of an organizational member, it will initially necessarily carry characteristics of a *misfit* (a).

Perceived discrepancies will immediately trigger sensemaking processes which aim at creating a refined, fitting image of the innovation. At this stage, member sensemaking should be supported by sensegiving communication (Gioia & Chittipeddi, 1991) from the organization's leadership and possibly external stakeholders in order to convince members that the innovation is indeed beneficial to the organization. How this can be effectively done is addressed in the next chapter. When such communications are skilfully carried out, members will in many cases be able to quickly understand that a certain novelty supports the organization on its path to the ideal organizational identity, so that the resulting, refined image of the innovation no longer appears as incongruent with the ideal organizational identity as

before. Adequate communication can also support the perception that the innovation will have a positive impact on the external prestige of the organization. Initial misfit perceptions due to uncertainties may thus quickly change into clear convictions that the innovation in fact carries *flagship* characteristics, as it is congruent with the organizational ideals and well-received by relevant external audiences (b).

If employees' sensemaking efforts do not achieve to reduce perceived incongruence but rather reinforce the impression that due to this innovation "*our values are less consistent*" or "*we send mixed messages about what is important to us*", the innovation is in serious danger of not receiving the necessary workforce support and of failing, ultimately. Sometimes there may be external circumstances which demand that even an innovation which bears low congruence with the organizational ideals be included in the portfolio. For instance, this could be the case when customer demand suggests adding certain complementary products or services to an organization's offering which really do not represent the organizational ideals in the eye of its members. In such instances, management has to make a careful decision whether meeting customer demands and grabbing a market opportunity is more valuable to the organization than preserving the coherence of the organizational identity. When the former is decided and accepted by the workforce, these innovations will become two-faced *Januses* to the workforce, appearing pretty to the outside and ugly to the inside (c).

Januses represent a constant conflict, though, and employees will continue to aim at resolving it through further sensemaking. This sensemaking will be significantly influenced by external feedback. If external prestige is effectively enhanced through the innovation, perceptions of incongruence will most likely diminish over time and the innovation will be accepted as a legitimate part of the portfolio, increasingly displaying *flagship* characteristics (d).

Flagships, then, are those innovations which are seen to contribute to the organization by driving it towards its ideal identity. Over time, the contribution in prestige which was originally made by a certain flagship innovation becomes a taken-for-granted aspect of the organizational identity. The longer a flagship innovation resides within a portfolio, the less it will be recognized how it originally contributed to

organizational prestige. Rather, the innovation's specific contribution will be taken more and more for granted and eventually be integrated into an overall enhanced prestigious image of the organization. Such innovations will continue to be seen as highly congruent with the ideal organizational identity, but will be less and less seen as innovations which take organizational prestige to the next level. They have become stabilizers (e).

The cycle may come to a completion, when organizational identity ideals evolve in such a way that former stabilizers start becoming incongruent. Changes in organizational identity ideals, however, have not been the focus of this study and require further research before one can draw conclusions and point out managerial implications.

In conclusion, the perspective developed in this work proposes to include identity considerations when strategically analyzing an organization's portfolio of products or services. It is clearly argued that it is often not sufficient to objectively assess economic values, synergies and complementarities when deciding in which direction to expand the portfolio through innovative elements. The reason is that such values and synergies may simply never be realized if the organizational members do not accept the new elements of the portfolio as enhancing the organization in relevant dimensions. Thus it is strongly recommended to assess members' perceptions as to whether certain innovations would be seen as misfits, januses, flagships or stabilizers.

While this assessment can be performed either for the existing complete set or certain subsets of the organization's innovations (including older products), it may also serve as a valuable tool to analyze single innovation options before they are created. In instances in which communication to the complete workforce is not (yet) intended, the IIM analysis could be performed by means of internal focus groups. Such pre-testing of innovation options could yield important insights as to how these innovations would be received and supported by the workforce. Also, performing the IIM analysis before such innovations are broadly discussed, will help management in sensegiving (Gioia & Chittipeddi, 1991), i.e. to decide which facts, narratives, symbolic actions etc. should be presented in order to guide the collective

sensemaking processes, so that members will find it easy to identify with the innovation.

Although many portfolio approaches derive generalized strategic recommendations for each matrix quadrant, this temptation is resisted here. It has to be kept in mind that, just as in most classical portfolio approaches (Wind et al., 1983), the determination of the matrix boundary values is somewhat subjective and so is the absolute positioning of the products in certain quadrants. Possible normed strategic decisions may thus be more dependent on the underlying assumptions than on the analysis or characteristics of the innovations. Still, their relative positioning points to the communication approach which should be applied to strengthen the members' identification with each innovation, thus raising overall portfolio performance. The present studies' questionnaire provides the necessary tools for validly assessing the degree of incongruence and prestige which innovations are seen to contribute to an organization's identity.

6.3.2. Applying the Innovation-Identity-Matrix (IIM): The HealthCo case

Having developed the IIM in the previous chapter, it is now applied to HealthCo's innovations to provide a practical case. The present analysis is performed at the organizational level and includes HealthCo's two latest innovations (Inno1 / Inno2) which have been described in detail in chapter 3.3.1. In addition, the last major product innovation which was introduced by HealthCo before Inno1 and Inno2 is also included in the analysis (Prod3). This product had been launched about two years before the study's data was collected and thus represents a product which is still new, but clearly more established than both other innovations. The relative approach for the IIM is chosen, because it is intended to compare products within a single portfolio. As previously explained, the boundaries for the matrix are thus determined by adding a margin to the lowest and highest data point of each dimension. The dimensions on the axes represent the members' perceptions of the innovations' prestige and incongruence effects, while the size of the 'bubble' reflects the standard deviation of members' cognitive identification with the innovation. Thus a relatively large 'bubble' signifies that members across the organization tend to differ as to how they view and identify with the innovation.

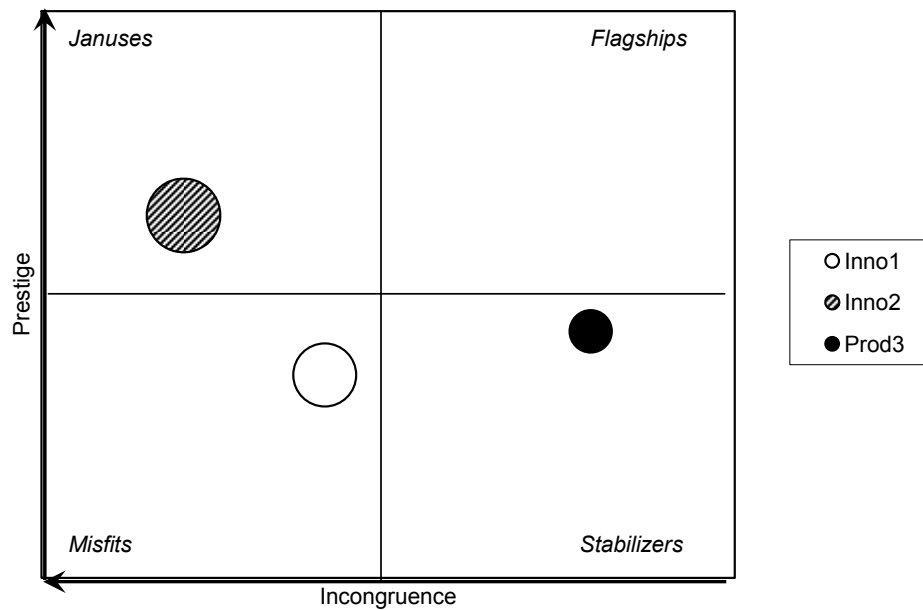


Figure 6.3: IIM of selected products for all members

Figure 6.3. shows HealthCo's IIM including its three latest product introductions as evaluated by all members of the data sample. Three major insights can be derived:

Firstly, the IIM visualizes that HealthCo members clearly differentiate innovations as to their impact on the organizational identity. Relative to the other innovations within the HealthCo's portfolio, Inno1 can be qualified as a Misfit, Inno2 as a Janus and Prod3 as a Stabilizer.

Secondly, the HealthCo IIM is consistent with the prediction that identification should rise along a diagonal from the lower left to the upper right corner. Members indeed identify least with the Misfit innovation ($mean=5.79$), slightly more with the Janus innovation ($mean=5.81$) and most with the Stabilizer innovation ($mean=7.63$).

Thirdly, the standard deviation of members' identification differs quite markedly and, possibly, in a systematic way across the three products. While identification is quite disparate for an innovation at the announcement stage (Inno2, $sd=1.83$), it is less heterogeneous for an innovation which has already been launched (Inno1, $sd=1.34$). The highest homogeneity in identification across the workforce is observed with the

established product (Prod3, $sd=.61$). In the present sample, then, identification levels tend to converge with increasing age of the product. Similarly, perceived incongruence decreases with the age of the product. Although the limited sample size of only three products does not allow for generalization, these observations are consistent with the notion that an underlying sensemaking process leads to refined and consistent images of products over time. The following section draws implications for each product.

In comparison with the other products within the portfolio, *Inno1* represents the most important challenge. Even though sensemaking has been going on for several months for this product, much of the workforce still appears to perceive that it is harming organizational identity congruence while contributing less to organizational prestige than the other innovations. Interestingly, the relatively large bubble size suggests that there are some members of the workforce who have nevertheless come to identify with the innovation. It could be worthwhile for management to meet with these members and to assess how they created a positive image of the innovation for themselves and 'made sense' of it differently than others. Their narratives and reasoning could be used as key building blocks for a successful communication strategy. Should no promising solution be found for a cognitive repositioning of *Inno1*, it needs to be considered whether economic goals legitimize its presence within the portfolio and whether these can be reached given the current internal perceptions of the innovation.

Although *Inno2* carries the highest perceived incongruence, for two reasons this burden may be less of a problem than in the case of *Inno1*. Firstly, *Inno2* is viewed as increasing HealthCo's prestige with the new customers markedly more than *Inno1* and so external feedback may, over time, contribute to *Inno2* being recognized as more congruent with the organization. Secondly, the standard deviation of members' identification with *Inno2* is highest among all three products, which evidences the fact that early sensemaking is taking diverse paths and quite a few members apparently arrive at a point where they have created an image of the innovation with which they can identify.

The established product, Prod3, proves to be a key pillar in support of the organizational identity. Although not superior to the other products in raising the prestige of the organization, it is perceived to be highly congruent with the organizational identity ideals. Besides its low incongruence rating, it also carries a low standard deviation in members' identification. This evidences that members have created a largely homogeneous image of this product. This product certainly comes closest to the ideal, the category prototype. It should definitely be nurtured and kept within the portfolio, because it provides stability to the perception of the organizational identity. As Prod3 plays a role in perception management, it may be rational to keep this product within the portfolio, even if it were not economically viable. Its contribution to organizational success could simply consist in supporting the impression that HealthCo is headed in the right direction. Prod3 may thus strengthen the level of organizational identification, which is a crucial performance driver for many organizational tasks.

The above applications of the IIM were based on averages across the complete workforce. However, the IIM can also serve to elicit disparities between different groups within the workforce. As an example, figure 6.4. differentiates perceptions of long- and short-tenured organizational members. The group of long-tenured members (L) comprises all employees who have served more than five years within the company and is denoted by a bold outline of the circle (n=61). The remaining members with a tenure of five years and less make up the short-tenured group (S)(n=87). The IIM shows that differences exist when averaging the perceptions for both groups.

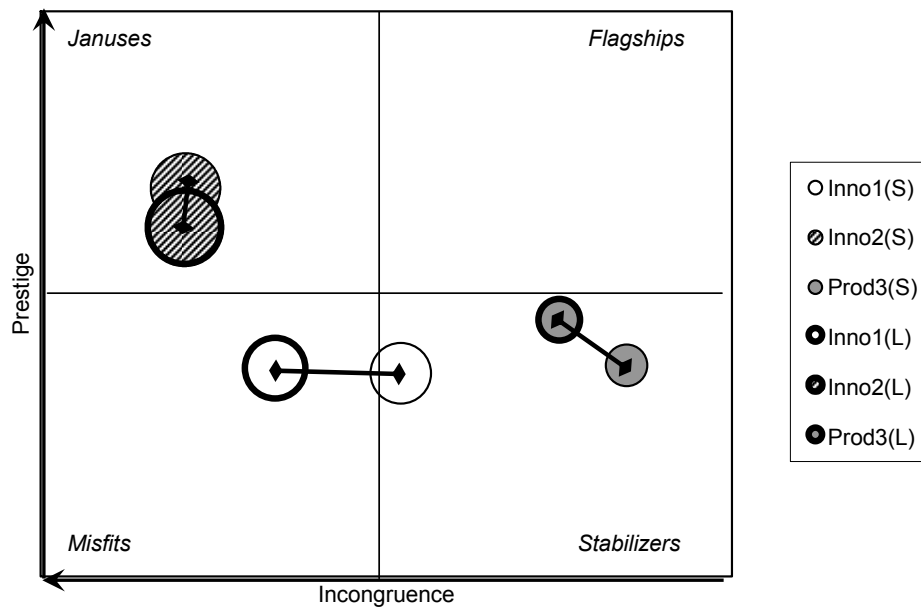


Figure 6.4: IIM of selected products for short- and long-tenured members (S/L)

HealthCo's long-tenured employees perceive a stronger incongruence effect for all innovations. This perceptual difference is very strong for those products which have already been launched (Inno1, Prod3), but only marginal for the innovation which is still in the announcement stage (Inno2). As was theoretically discussed in chapter 3.5, longer-tenured members may tend to perceive a smaller identity gap than their short-tenured colleagues. If they indeed view current and ideal organizational identities to be very close, they will, in most cases, perceive that innovations move the current organizational identity away from the ideal. This could be the reason that longer-tenured members tend to attribute a higher incongruence effect to innovations.

In conclusion, the present chapter has derived the IIM as a tool for positioning and evaluating an organization's innovations from a cognitive perspective. Once this evaluation of the portfolio is completed and decisions have been taken as to which products need efforts of (re-)positioning, a communication strategy has to be crafted which aligns innovations with organizational ideals. Suggestions for the development of such a communicative strategy are presented in the following chapter.

6.4. Communicating innovations: A new communication process

6.4.1. Developing Innovation-Identity Communications (IIC)

Based on the studies' findings, the IIM has been proposed as a tool which supports management in finding out which innovations' cognitive positioning can and should be improved in order to raise member identification with the innovations and with the organization as a whole. Beyond providing analytic insights as to *which* innovations to focus on, the above research also allows to derive specific recommendations as to *how* these positioning goals may be achieved.

Suggestions aiming at influencing cognitions about organizational aspects belong to the wider area of organizational perception management (Elsbach, 2003b). Within the domain of perception management, the recommendations made here will focus on communication aspects. It is acknowledged, though, that a comprehensive set of perception management actions may additionally include supportive symbolic behaviours or physical markers (e.g. signs, office decor, logos, etc.) (Elsbach, 2003b).

The present work has shown that members identify with innovations which enhance the organizational identity in a positive way, i.e. in a way which supports the members' self-concept. It was found that members identify with innovations when they perceive them to contribute to organizational distinctiveness, congruence and prestige, thereby supporting their sense of self-distinctiveness, self-continuity and self-esteem as organizational members.

The following simple, but powerful conclusion can, thus, be derived as a guideline for communicating innovations: Communications about innovations, including verbal accounts and categorizations, should clearly explain how the focal innovation enhances member self-distinctiveness, self-continuity and self-enhancement either directly or indirectly by addressing the innovations' effect on organizational identity distinctiveness, congruence or prestige. Such communications will support member sensemaking and facilitate their conclusion that indeed, the innovation fits well with the organization and with self, which will lead them to identify with the innovation.

The following steps are suggested for developing communications which support member identification with innovations (see figure 6.5.).

- First, assess the cognitive positioning for the innovations of interest by means of the IIM, as construed by a representative subset of the workforce.
- Second, decide whether certain innovations score too low on any of the dimensions and need a different positioning. This decision should be based on analyses of both relative and absolute IIMs and include an initial and brief cost-benefit estimate of the repositioning effort.
- Third, find out how members construe the current and the ideal organizational identity for themselves. The focus of this dialogue with members should be on the identity content including, for instance, stories they tell, expressions they use or (symbolic) comparisons they make.
- Fourth, building on these narratives, discuss how and in what areas the focal innovation is perceived to add to or take away distinctiveness, congruence or prestige.
- Fifth, select elements from the collected interview data which may be helpful in showing that the innovation is indeed contributing to members' self-distinctiveness, self-continuity and self-enhancement and combine, relate and complement them to come up with in a consistent set of communications. When the focal innovation is still at the idea stage and has not yet been discussed extensively among the workforce, the process can proceed to the sixth step. However, when dealing with an existing innovation which has already been announced to and widely discussed by the workforce, it may be necessary to first break down the established meaning of the innovation, i.e. to perform 'sensebreaking' (for more details on how to achieve sensebreaking in identification management see (Pratt, 2000) or research based on the related concept of 'unfreezing' (Lewin, 1952)). This creates a 'void' which can then be filled with the new meaning via sensemaking.

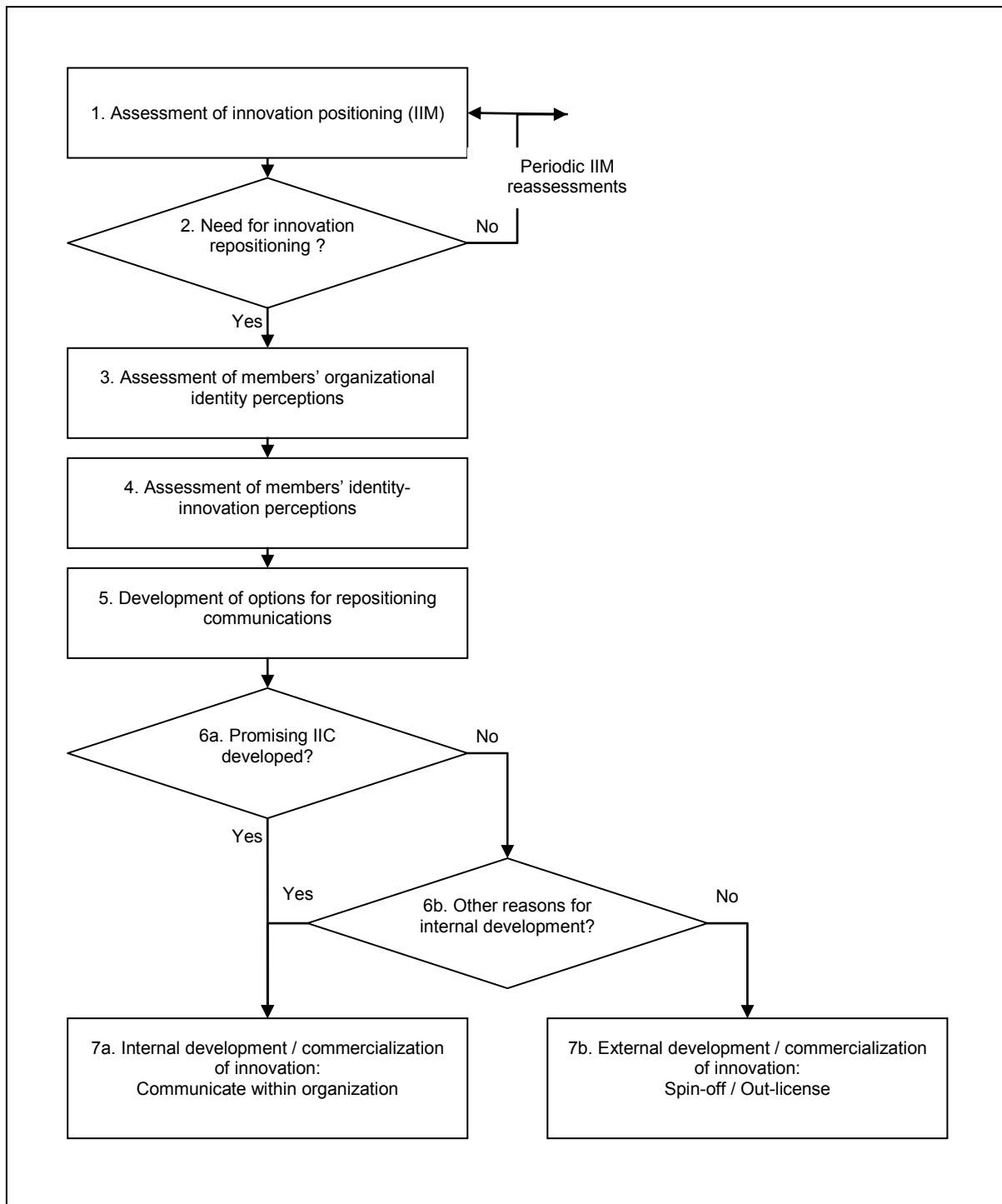


Figure 6.5: Stylized Innovation-Identity-Communication (IIC) process

- Sixth, decide whether the developed communications promise to achieve the desired cognitive positioning of the innovation among the workforce. If this can be confirmed, start implementing the communication strategy as a seventh step. If the developed communication solutions do not appear powerful enough to

enhance the innovation's image, the innovation should only be introduced or kept within the portfolio if other reasons, e.g. the prospects of a high return on investment, legitimize an expected loss of identification among the workforce. Such considerations must not ignore that an innovation's economic and cognitive effects are highly intertwined. If the workforce will not identify with the innovation, an expected return may not be attainable in practice. In such cases, it may be the best option to externally commercialize the innovation, or — if there is enough potential — to spin it off and to develop it as a separate entity with a different organizational identity.

- Seventh and last, communicate!

6.4.2. Applying Innovation-Identity Communications (IIC): The Apple case

In the previous section, principles have been developed which can guide the communication of innovations. This section now shows, by means of an exemplary case study, how these principles can be put into practice to deliver results.

The Apple corporation is chosen as an example, because it is cited by many as one of the companies which is best able to engender loyalty and identification among its members and other stakeholders (Satmetrix Systems, 2006). The empirical case of interest is the Macworld conference in Boston in the year 1997. At that time, the Apple corporation is in dire straits. Steve Jobs, one of the two original founders and the new interim CEO of the organization announces an innovative action of the organization which would, at that time, be seen by most members of the Apple community as fundamentally incongruent with Apple's identity. That is, before his keynote speech. By diligently communicating how this innovation will enhance Apple's distinctiveness and its prestige and by explaining why it really isn't incongruent with Apple's ideals, Jobs succeeds in winning many of the hearts and minds of his stakeholders in the crowd as evidenced by their reaction. Before this historic communication is analyzed, some more information on the background of Apple's situation may be helpful for understanding the overall situation of Apple at that time.

Founded in 1976 by Steve Wozniak and Steve Jobs at ages 26 and 21 at the Homebrew Computer Club in Palo Alto, Apple quickly became a publicly quoted company passing the billion dollar threshold in sales in the 1980s, making it the second largest player in the personal computer market behind IBM. Apple invented multiple breakthrough innovations including the Apple II, electronic spreadsheets, floppy and hard disk drives, the FORTRAN programming language and the Macintosh. But in the mid-1980's, problems started to emerge. Steve Jobs clashed with the board and was ousted from his CEO post. Over the next ten years, Apple's market share sank as they had difficulties in broadening the Macintosh's customer base and several innovations did not achieve the desired market success, like the Newton, Apple's first personal digital assistant. While competitors such as IBM, Dell or Microsoft were successfully riding the tech wave in the late 1990s, which had in many aspects been facilitated by Apple's original inventions, Apple was struggling financially. In the summer of 1997, right before the Macworld conference, Apple reported a net loss in excess of USD 700 million for its second quarter. Then, at the conference, Steve Jobs announced his return to Apple as interim CEO, along with a series of innovative actions that would change Apple. The keynote he gave at this conference is considered one of the most important in the company's history, a defining moment of Apple's subsequent return to success (Cantrell, 2006).

To avoid selection bias, a complete section of Jobs' speech is provided without modifications or omissions of words. In order to point out the sections of his speech which are of special interest, some words are formatted in bold letters. Also, a set of abbreviated markers are inserted into the text which provide an interpretation of the marked section in light of the theories developed in this thesis. The following markers are used:

[c]: marks a line which alludes to organizational continuity

[d]: marks a line which alludes to organizational distinctiveness

[p]: marks a line which alludes to organizational prestige

[sg]: marks a section which aims at sensegiving (incl. sensebreaking)

The following part of the keynote speech represents the section where he communicates a set of innovative changes to the Apple community. While these

innovative actions are most incongruent to the current ideals of the Apple community, they are also of critical importance to Apple's survival. This situation, therefore, represents a formidable challenge for innovation-identity communications.

Jobs starts off by performing some clear-cut sensebreaking and sensegiving (Gioia & Chittipeddi, 1991). The current paradigm in the Apple community was, at that time, to categorize Apple and Microsoft as fierce competitors which could only win if the other lost. He attempts to de-categorize this perception by alluding to a biological ecosystem where he equates Apple and Microsoft to organisms which are in relationship to and in need of each other. By making a categorization of Apple and Microsoft salient at a higher level (the common ecosystem), he opens a way to view Microsoft as being a part of Apple's in-group. This represents new sensemaking, because Apple used to position Microsoft as a quite prototypical exemplar of its outgroup. Typical of this former perspective was Jobs' keynote speech a decade earlier, when he categorized Apple's large competitors (especially IBM) as the 'big brother' which was about to dominate the industry and called for revolutionaries as embodied by Apple.

*Jobs: "Now I'd like to talk about meaningful partners. Apple lives in an **ecosystem [sg]**, and it **needs help from other partners**. It **needs to help** other partners. And relationships that are destructive don't help anybody in this industry as it is today. So during the last several weeks, we have looked at some of the relationships, and one has stood out as a **relationship** that hasn't been going so well, but had the potential, I think, to be great for both companies. And I'd like to announce one of our first **partnerships** today, a very, very meaningful one. And that is one with Microsoft. I'd like to take you through this."*

Jobs then continues with de-categorizing Apple and Microsoft as rivals and re-categorizing them as partners by focussing on differences between Microsoft and Apple which lie in their actions or 'doing' (patent disputes), and not in their identity, or 'being'.

*“The discussions actually began because there were some **patent disputes [sg]**. And, rather than ...”*

[Audience laughs]

*“I know. Rather than repeating history, I'm extremely proud of both companies that they have **resolved** these **differences [sg]** in a very, very professional way. And this has led, I think, to an **overall relationship** that we're announcing today that has got several parts to it, and we're extremely excited about.”*

Having created a picture where Apple and Microsoft are not different in identity, but only in their actions, he can legitimately claim that they have been resolved. The content of the following lines is mostly technical and serves to validate prior claims made.

“First part of it is a patent settlement and cross-license. The two companies have received a full cross-license for all patents that exist and for patents that are filed within the next five years. It has been a very serious patent settlement. The second part of this is, Microsoft is committing to release Microsoft Office on Macintosh for the next five years. They are going to release the same number of major releases as they release on Windows during that time. Their first release, they're going to target to have it out near the end of the year, it might slip a few months into next year, but they're working real hard on it, and it looks very, very good.”

Then follows the most critical part of the speech, the announcement of the innovative action which would be perceived as highly incongruent with what Apple stands for. It is interesting to note how Jobs' formulates that “Apple” has taken a decision. In contrast to most of the speech, Jobs avoids using the assumed “we” when mentioning the incongruent decision. Nevertheless, he gets a clear negative reaction from the audience:

*“Next, we have taken a look at browsers out there and **Apple has decided** to make Internet Explorer **its default browser** on the Macintosh.”*

[Audience boos]

The strong and immediate audience reaction tells that the idea of including a Microsoft tool on the Macintosh by default must have felt like a serious blow to their ideals for Apple. Their initial sensemaking must have come to the conclusion that the Internet Explorer is highly incongruent with the Macintosh and everything that it embodies about Apple. Jobs does not leave his audience with this impression for more than just a second, but immediately supports favourable sensemaking with his next line:

*“Since **we believe in choice [d]**,...*

[Jobs pauses and smiles, audience laughs]

Jobs here instantly accentuates the distinctiveness of Apple and its ideals by contrasting it to Microsoft which he positions as not believing in choice. The audience reaction tells that his allusion to this cherished Apple ideal succeeds in winning many over.

*... since **we believe in choice [c]** we're going to be shipping other Internet browsers, as well, on the Macintosh, and the user can, of course, change their default should they choose to.”*

Enabling choice has been an important distinguishing element of Apple's identity since its early beginning, as is clearly embodied in their famous 1984 'big brother' advertisement. Thus, maintaining the right to choose within this innovation also invokes identity continuity and congruence. Note also, that Jobs does not primarily argue that it is the market which requires choice, but that this decision flows from who Apple is and what they believe in.

“But we believe that Internet Explorer is a really good browser, and we think it's going to make a fine default browser. Java. We are going to be collaborating with Microsoft on Java to ensure that we can get the best from each other and ensure that there's compatibility between our virtual machines. We think that will serve everybody's interests. And lastly, Microsoft is making an investment in Apple. Microsoft is buying \$150 million worth of Apple stock at market price. It is non-voting shares. [Cheers] and they've agreed not to sell them for at least three years. So what this means is that Microsoft is going to be part of the game with us as we restore this company back to health, have a vested interest in that stock price going up. We're going to be working together on Microsoft Office, on Internet Explorer, on Java. And I think that it's going to lead to a very healthy relationship. So it's a package announcement today. We're very, very happy about it. We're very, very excited about it. And I happen to have a special guest with me today via satellite downlink. And if we could get him up on the stage right now ...

[Gates appears on screen. Mix of applause and boos.]

Having established that Microsoft is not the enemy, but part of the ingroup and that the innovative changes to Apple will not fundamentally threaten its identity, the Apple community is now prepared enough to get in direct contact with the new ‘ingroup member’. In his address, Gates very diligently alludes to Apple’s distinctiveness and prestige in order to win the audience.

*Gates: “Some of **the most exciting work [d]** that I've done in my career has been the work that I've done with Steve on the Macintosh. Whether it's the first introduction or doing products like Mac Excel, these have been major milestones, and it's very exciting to renew our commitment to the Macintosh. We have over 8 million customers using Microsoft software on the Macintosh. We make it very easy for people who use Macintosh to take their, their documents and work with all kinds of machines. We're very excited about the new release we're building. This is called Mac Office 98. We do expect to get it out by the*

end of this year. And we've got some, some real exciting features. It's a product that's going to require no setup. It's going to be an easy transition from people in the past."

Most of Gates' initial fact-oriented lines get little reaction, maybe because the community needs to get over the shock to see him speak at Macworld. However, as soon as he touches upon the identity prestige and distinctiveness of Apple, he gets a response from the audience:

*And I think it's going to really **set a new benchmark [d]** for doing a good job with performance, and exploiting **unique [d]** Mac features. In many ways it's **more advanced than what we've [p]** done on the Windows platform."*

[Audience applauds]

Having made salient the distinctiveness and prestige of Apple and its Macintosh product, Gates now proceeds to show that adopting the innovation is not going to threaten Apple's distinctiveness within the industry. He explains that the development of Apple products will be separated from the general 'Windows environment'. This serves to show that the Macintosh version of the Internet Explorer is going to be distinct from other Microsoft products.

*"We're also excited about Internet Explorer. And we've got a very dedicated team that's **down in California [d]** that works on that product. And the code is **really specially developed [d]** for the Macintosh. **It's not just a part of [d]** what we've done in the Windows environment."*

Gates leaves the audience with an allusion to Apple's prestige by mentioning its contribution to the industry and by positioning Apple at the top. Microsoft only appears as a supportive element, not a threatening, dominating rival.

*"And so we're pleased to be supporting Apple. We think Apple makes a **huge contribution to the computer industry [p]**. We think it's*

*going to be a lot of fun **helping out [p]**, and we look forward to the feedback from all of you as we move forward doing more Macintosh software. Thanks.”*

[Audience applauds]

After this sequence of sensebreaking and sensegiving about Apple’s specific innovative actions, Jobs comes back to the broader shift in perception which he is advocating. Winning the Apple community to accept this new perception is an essential prerequisite for their identification with his innovative changes. He tries to convince them by arguing that accepting his sensebreaking and adopting the new perspective leads to enhanced organizational prestige.

*Jobs: “Thank you, Bill. You know, where we are right now, is we’re shepherding some of the **greatest assets in the computer industry [p]**. And if we want to move forward, and see Apple healthy and prospering again, we have to let go of a few things here. We **have to let go of this notion that for Microsoft to win Apple has to lose [sg]**. We have to embrace a notion that for Apple to win, Apple has to do a really good job. And if others are going to help us, that’s great, because we need all the help we can get. And if we screw up and we don’t do a good job, it’s not somebody else’s fault. It’s our fault. So I think that’s a **very important perspective [sg]**. I think if we want Microsoft Office on the Mac, we better treat the company that puts it out with a little bit of gratitude. We’d like their software. So **the era of setting this up as a competition between Apple and Microsoft is over [sg]** as far as I’m concerned. **This is about [sg]** getting Apple healthy, and this is about **Apple being able to make incredibly great contributions to the industry [p]**, to get healthy and prosper again.*

Jobs goes on and suggests that by changing the perspective on Apple, new and additional aspects of organizational prestige can be discovered. This serves as preparation for his suggestion that changing the perspective on Microsoft and collaborating with the former rival also allows for enhanced organizational prestige. In

sum, Jobs basically proposes that the announced innovative actions in cooperation with Microsoft will be supportive of Apple's organizational prestige:

*“The last perspective I'd like to leave with you on this is sometimes points of view can really make you **look at things differently [sg]**. Like for me, when I was looking at the statistics and it hit me that Apple is the **largest education company in the world [p]** that was like a bolt of lightning. That's huge. What an incredible base to build off of. Another bolt of lightning is that **Apple plus Microsoft equals 100 percent of the desktop computer market [p]**. And so, whatever Apple and Microsoft agree to do, it's a standard. And I think that you'll see us work with Microsoft more because they're the only other player in the desktop industry and I think that you'll want to see Microsoft work with Apple more because **Apple is the only other player in the desktop industry [p]**. So I hope we have even more cooperation in the future because the industry wants it”.*

Finally, Jobs ends his talk by directly and forcefully addressing Apple identity ideals, with a clear focus on its distinctiveness as a pioneering company. Having just returned after a ten year absence and announced a highly incongruent, major innovative action, this may serve as an assurance to the community that he still understands and represents Apple's identity ideals.

*“Lastly, I want to just talk a little **about Apple and the brand and what it means, I think, to a lot of us [sg]**. You know, I think you always had to **be a little different [d]** to buy an Apple computer. When we shipped the Apple II, you had to think **different [d]** about computers. Computers were these things you saw in movies, they occupied giant rooms. They weren't these things you had on your desktop. You had to think **differently [d]** because there wasn't any software at the beginning. You had to think **differently [d]** when a first computer arrived at a school where there had never been one before and it was an Apple II. I think you had to think really **differently [d]** when you bought a Mac. It was a totally **different [d]** computer, worked in a*

*totally **different [d]** way, used a totally **different [d]** part of your brain. And it opened up a computer world for a lot of people who thought **differently [d]**. You were buying a computer with an installed base of one. You had to think **differently [d]** to do that.”*

Having established Apple’s distinctiveness in the past, he now assures the community that he cherishes and embraces this identity also in the present time and for the future. By doing this, he ensures continuity for the future. He wraps it up by affiliating Apple with the ‘creative spirits that are out to change the world’. This enhances the perception of Apple’s prestige.

*“And I think you **still** have to think **differently [c]** to buy an Apple computer. And I think the people that do buy them **do think differently [c]** and they are the creative spirits in this world. They are the people that are not just out to get a job done, they are out to change the world. And they’re out to change the world using whatever great tools they can get. And **we** make tools for **those kinds of people [p]**.”*

Lastly, Jobs ends his keynote by summarizing the goals of Apple under his renewed leadership and alludes to the Apple community distinctiveness, its continuity and its prestige.

*“So hopefully what you’ve seen here today are some beginning steps that give you some confidence that we, too, are going to think **differently [d]**, and serve the people that have been buying our products **since the beginning [c]**. Because a lot of times people think that they’re crazy. But in that craziness, we see **genius [p]**, and those are the people we’re making tools for. Thank you very much.”*

[Audience offers standing ovations]

In sum, Steve Jobs’ history keynote speech represents an excellent case study evidencing how even challenging perceptions of innovations and their identity effects can be successfully managed through effective innovation-identity communications.

7. Conclusion

This thesis theoretically develops and empirically evidences how current cognitive and organizational psychological insights can be fruitfully integrated with innovation research and lead to an enhanced understanding of innovation management. Specifically, categorization, social identity and organizational identity theories are here adapted and applied to innovation challenges. This sheds new light on cognitions, affects and behaviours of organizational members towards innovative organizational change and explains an important part of the members' behaviours and innovations' selling performance. Moreover, insights from the studies facilitate the development of managerial tools for managing identity and identification concerns throughout the innovation process and across an organization's innovation portfolio. In sum, the thesis uncovers that innovations, organizational identity and identification are intrinsically related in organizational contexts. Understanding and successfully managing identity and identification is critical for innovation and organizational success.

8. Appendix: Development and Validation of Study Constructs

8.1. Methodological foundations

Overview

As explained in chapters 3 and 4, this thesis views identity-related phenomena as socially constructed and thus inherently linked to the individual level. In consequence, the assessment of such phenomena is necessarily subjective in nature. Equally, when innovative change is perceived to impact organizational identity, evaluations of innovations are also highly subjective. Gaining reliable, valid and generalizable insights into the theoretical realm of identity and innovation therefore presents a formidable scientific challenge. It calls for a diligent, rigorous selection and application of adequate research methodologies. And it asks for a transparent and detailed presentation and justification of the research process chosen. The present chapter therefore provides this introduction and lays the methodological foundations for an adequate conceptualization and measurement of identity- and innovation-related phenomena. The remainder of the chapter is structured as follows. First, basic methodological terms are defined, classified and discussed. Second, a four-step process underlying the development and validation of measures and constructs is presented.

Definitions

According to the orthodox view within the philosophy of sciences, a scientific theory can be understood as a system of concepts, hypotheses and observations which form a network of meaningful interrelations (Bagozzi & Phillips, 1982). Three different types of concepts (empirical, derived, theoretical) can be differentiated: Firstly, there are *empirical concepts* which can be characterized as “...*properties or relations whose presence or absence in a given case can be intersubjectively ascertained...by direct observation.*” ((Hempel, 1965) p.22). As they can be easily measured, empirical concepts are at the lowest level of abstraction among the three different types of concepts. At the highest level of abstraction are *theoretical concepts* which can be defined as “...*abstract, unobservable properties or attributes of a social unit or entity*” ((Bagozzi & Phillips, 1982) p.465). Finally, *derived concepts* mediate

theoretical and empirical measures and are thereby typically less abstract than theoretical concepts (Bagozzi & Phillips, 1982).

Four types of relationships can be formed between different concepts (Bagozzi & Phillips, 1982). They are, in descending order of abstraction: First, *nonobservational hypotheses* which allow for relationships among theoretical concepts. These are often referred to as theoretical laws, causal relations or, briefly, *hypotheses*. Second, *theoretical definitions* which link theoretical concepts to derived concepts. Third, *correspondence rules* which define relationships between unobservable concepts (theoretical and derived) and observable (empirical) concepts. And, finally, *empirical definitions*, or operationalizations, which provide meaningful and measurable content for empirical concepts.

In keeping with standard methodological literature, the above described concepts are also often referred to as *constructs*, *factors* or *indicators* (Backhaus, Erichson, Plinke, & Weiber, 2003; Hair et al., 2006; Homburg & Giering, 1996). To start with the least abstract, an empirical concept is often also labelled an *indicator*. The more abstract, theoretical concepts are generally called *constructs* or *factors* depending on their characteristics. Theoretical concepts are typically differentiated firstly, by the number of derived concepts and, secondly, by the number of derivation levels they include. In its simplest form, a theoretical concept will not include any derived concept, but will be directly linked to indicators. This type of theoretical concept is referred to as a *single-factorial construct* (Homburg & Giering, 1996), or simply, a *factor*. In contrast, when a theoretical concept subsumes several derived concepts, it can be classified as a *multi-factorial construct*. Multi-factorial constructs may again be divided into *unidimensional* multi-factorial constructs when they comprise of just one level of derived concepts or *multidimensional* multi-factorial constructs when they are composed of multiple levels of derived concepts. In this thesis, all constructs are single-factorial. In consequence, the terms construct and factor are interchangeably used in this thesis. To summarize, *constructs* and *factors* can be defined in conceptual terms but cannot be measured directly (Hair et al., 2006). In order to assess them empirically, *relationships* need to be formed among them and linking them to observable *indicators*.

Two major challenges arise when attempting to appropriately relate indicators and factors. Firstly, the nature of their relationship needs to be resolved. As mentioned previously, relationships between indicators and factors take the form of correspondence rules (Schnell, Hill, & Esser, 1999). They allow for assigning observed characteristics of indicators to their corresponding factors, they “...supply empirical meaning to theoretical terms and imply that the correspondence can be represented as a matter of degree” ((Bagozzi, 1984) p.21). There are different types of correspondence rules (Bagozzi, 1984; Petrie, 1971) and the choice of the appropriate correspondence rules is still a subject of debate in the philosophy of science (Schnell et al., 1999). When adopting a Popperian perspective on theory validation, the adequacy of such a choice will necessarily remain a temporary solution, because a theorized relationship — such as a correspondence rule — can never be proven true. It remains valid until falsified (Hu & Bentler, 1995; Popper, 1935 (2002)). Hence, correspondence rules in this study always carry the character of hypothesized relationships. Likewise, the corresponding factors or constructs must be understood as hypothetical entities and need to be tested.

A correspondence rule that has proven to be particularly valid in organizational research over decades is the causal indicator model (Bagozzi, 1984; Bagozzi & Phillips, 1982). Two sorts of causal indicator models can be distinguished (Bagozzi, 1979; Bollen & Lennox, 1991):

Firstly, in a *reflective indicator model*, the factor is hypothesized to be a cause for the empirical condition of the indicators. They are regarded as interchangeable sample indicators stemming from the conceptual domain of the factor. Thus, a high correlation between the indicators can be expected. Elimination of indicators does not per se change the conceptual domain of the factor as long as a sufficient number of indicators are retained (Hair et al., 2006). At the same time, the reflective indicator model acknowledges that the focal factor may not be the sole influence on the observed indicators. Accordingly, it explicitly allows for measurement error of the indicators.

Secondly, in a *formative indicator model* the reverse is posited: Indicators are assumed to cause the empirical condition of the factor. Hence, the formative indicator

model is predicated on the assumption that the indicators are measured without error. And so, the factor is to be interpreted as a composite index, an abstract condensation of all the information present in its indicators (Hair et al., 2006).

This study chooses reflective indicator models for two reasons. Firstly, most factors in this study build on previously established factors which had adopted a reflective approach. Secondly, social science constructs relating to attitudes, personality and behavioural intentions — such as the study of identity-related phenomena — are especially consonant with the reflective indicator model (Bollen & Lennox, 1991). In the highly subjective, psychological realm of identity theories it may well be essential for the achievement of reliable and valid measurements to use multiple indicators while explicitly acknowledging the potential of error in their measurement, which has been commonly recognized as a serious problem throughout the social sciences (e.g. (Fiske, 1982)).

Now that the nature of factors, indicators and their interrelationships has been discussed, the appropriate *number of indicators* needs to be determined. Bluntly stated, there is no general rule as to how many indicators should be chosen per factor (Schnell et al., 1999). This is due to the fact that an increasing number of indicators carries the upside of potentially increasing the reliability and generalizability of the factor (Bacon, Sauer, & Young, 1995) but also entrenches the downside of requiring larger sample sizes and increasing the risk for artefact factors (Hair et al., 2006).

Still, a necessary minimal number of indicators can be identified. At least two indicators are required for controlling measurement error and testing the level of correspondence of the indicators with the factor (Schnell et al., 1999). When it is intended to perform certain more elaborate tests on a single factor separately from others — such as a confirmatory factor analysis — the necessary minimum number rises to at least four indicators (Hair et al., 2006). In such tests, a separate assessment of a factor with only two indicators would result in an *underidentified* solution because the parameters to be estimated would exceed the available unique variance and covariance terms. Even a factor with three indicators cannot be meaningfully tested by itself. It leads to a *just identified* solution, because the number

of available variances and covariances equal the number of parameters to be estimated. All information is used up in the estimation process and, thus, the results will always signal a perfect solution. For meaningful separate testing, then, constructs need to consist of at least four indicators in order to be *overidentified*. In contrast, when testing within a larger model comprising multiple factors, overidentification can also be achieved by means of two-item factors as long as each of them has at least one significant relationship with any other factor (Hair et al., 2006). Consequently, if the construct comprises more than one dimension, each factor may be measured by at least two indicators (Bollen & Lennox, 1991).

Having proposed, firstly, that constructs and indicators, as well as their interrelationships must be regarded as hypothetical and, secondly, that errors in measurement are to be expected, it is apparent that the quality of constructs will vary and must be tested. The following section develops how such constructs can be assessed in terms of their reliability and validity.

8.2. Methods for assessing models and constructs

Overview

A precise definition of reliability and validity can be depicted through the following formula (Churchill, 1979). It states that an observed score of an indicator variable (X_O) will be equal to the combination of the unobserved true score (X_T) and the scores of two types of measurement errors ($X_S + X_R$). These errors can stem from multiple sources such as personal characteristics, situational influences or methodological shortcomings (Churchill, 1979). They can be differentiated by their sources and impact on the observed score. *Systematic error* (X_S) is caused by stable sources and independent of random influences. And so, it will appear with the same score in every round of measurement. In contrast, *random error* (X_R) is produced by transient sources and will impact the observed scores differently at each measurement.

$$X_O = X_T + X_S + X_R$$

With: X_O = Observed score

X_T = True score

X_S = Systematic error (stable sources)

X_R = Random error (transient sources)

Perfect reliability: $X_R = 0$

Perfect validity: $X_R = 0$ and $X_S = 0$ or $X_O = X_T$

Reliability assesses the degree of consistency between multiple indicators of a variable (Hair et al., 2006). Relating to the above formula, the reliability of a construct is defined as “...the degree to which measures are free from random error and therefore yield consistent results” ((Peter, 1979) p.6). Thus, indicators can be deemed perfectly reliable measures of the factor when all of their variance is explained by their association with the factor and no random error is present ($X_R = 0$) (Peter, 1979). In this case, independent but comparable measures of the same construct agree (Churchill, 1979).

Validity assesses the degree to which a set of indicators represents the concept of interest (Hair et al., 2006). Returning again to the above formula, perfect validity is achieved when “...the differences in observed scores reflect true differences on the characteristic one is attempting to measure and nothing else”. ((Churchill, 1979) p.65). Perfect validity is attained, when $X_O = X_T$. This is fulfilled when both, $X_R = 0$ and $X_S = 0$. As reliability only postulates the absence of random error but does not parcel systematic error from the observed score, a reliable measure is not necessarily valid. Reliability is a necessary but not sufficient measure for validity (Churchill, 1979). Four types of validity are habitually distinguished:

Content validity refers to the degree of correspondence between the selected indicators and the conceptual domain of a construct (Churchill, 1991; Hair et al., 2006). This type of validity is also known as ‘face validity’ because the conceptual correspondence is typically assessed in subjective ways, based on the researcher’s judgement (Hair et al., 2006). Content validity derives its importance from the necessity to understand the meaning of each indicator before any other testing can

be performed. Seen from this angle, it may be the most important validity test (Hair et al., 2006).

Convergent validity of a construct can be defined as the degree to which several indicators agree when the same concept is measured through dissimilar methods (Bagozzi & Phillips, 1982). Thus, convergent validity connotes that indicators of the same construct are expected to show high levels of correlation with each other. The application of different methods reduces the risk that these high correlations merely stem from common method variation. Thus, the assessment of convergent validity is consistent with the causal indicator model of correspondence rules described above.

Discriminant validity of a construct is the degree to which the indicators of distinct concepts differ (Bagozzi & Phillips, 1982). Thus, indicators of different constructs are expected to share little common variance. Applying similar methods can support discriminant validity, in contrast to convergent validity, by reducing the risk that variance in the results is merely caused by the difference in method.

Nomological validity of a construct represents the degree to which predictions based on a concept are confirmed within the context of a larger theory (Bagozzi, 1979). Hence, the assessment of nomological validity requires relating the focal construct to an existing, overarching theoretical framework (Peter & Churchill, 1986). Nomological validity is given, if measured relationships among the constructs support their theoretically determined linkage (Hair et al., 2006).

To sum up, only if a measurement model meets all four types of validity it can be regarded as a *valid* measurement model for the hypothetical construct.

The previous sections have reviewed the notions of reliability and validity of constructs as fundamental criteria to assess their quality. In the next section, the process of determining construct reliability and validity will be discussed. This process can be structured into a fairly standardized sequence (Hair et al., 2006; Homburg & Giering, 1996). Although each of the methods has unique features, they may be broadly classified into 'first generation' and 'second generation' methods (Homburg & Giering, 1996).

First generation methods

Since the influential works of educational psychologist Lee J. Cronbach (Cronbach, 1947, 1951) in the early 1950s, a diverse range of methods have been developed and applied within the social sciences to assess construct reliability and validity. Among them, Cronbach's coefficient alpha and the criterion of Item-Total correlation will be performed to assess construct reliability, while Exploratory Factor Analyses (EFA) will serve to gain first insights into construct validity.

Cronbach's Alpha

Cronbach's Alpha (Cronbach, 1951) is the most widely used reliability measure (Cortina, 1993; Hair et al., 2006). It measures the internal consistency of a set of indicators. Cronbach's alpha represents the average of all correlations which result from, firstly, splitting the construct's indicators into two groups, in every possible way and, secondly, correlating the sum of each indicator combination. Cronbach's alpha ranges from 0 to 1 and is recommended to reach at least .70 (Nunnally, 1992). Lower scores may be acceptable in certain circumstances. E.g. in an early exploratory setting, at least .60 should be attained (Hair et al., 2006). Also, as the Cronbach's Alpha criterion is positively dependent on the number of indicators (Homburg & Giering, 1996), it may be justified to be somewhat less demanding when assessing constructs that consist of only a few indicators.

In addition, the computation of Cronbach's Alpha is based on two limiting assumptions. Firstly, the indicators are assumed to form a unidimensional set and, secondly, all indicators are supposed to have equal reliabilities (Gerbing & Anderson, 1988). While the question of unidimensionality is of high importance and must be dealt with by appropriate factor analyses, the second limitation has been shown to be of very little practical consequence except for extreme cases (Gerbing & Anderson, 1988). Still, because Cronbach's Alpha presumes the same reliabilities of all indicators, it does not provide information on each indicator's contribution to the overall construct reliability. Thus, it does not point out which indicators may be eliminated in order to raise construct reliability.

Item-Total correlation

This information may be obtained via the calculation of *Item-Total correlation*. This measure appraises reliability by focusing on the contribution of each individual indicator to the reliability of the construct (Nunnally, 1992). It is computed by correlating a focal indicator with the sum of all indicators which belong to the construct (Churchill, 1979). Item-Total Correlation ranges from 0 to 1. In general, Item-Total correlation scores are not evaluated in comparison to a defined, absolute threshold level. They rather serve as a guide for improving the overall reliability, when overall Cronbach's Alpha levels are too low. In such cases, the indicator with the lowest item-total correlation may be eliminated (Homburg & Giering, 1996).

Exploratory factor analysis

In contrast to both previously mentioned criteria which assess reliability, an *exploratory factor analysis* (EFA) focuses on the validity of a construct. Also, while the above criteria require that indicators be pre-assigned to their respective constructs, EFA is performed independently of any theory linking indicators and constructs. Instead, EFA explores the underlying indicator data from a purely statistical basis. EFA suggests what number of factors as well as which assignment of indicators to factors best represents the underlying data. The correlations between the indicators and the extracted factors are called factor loadings. Factor loadings represent a key criterion for the assessment of the validity of extracted factors (Hair et al., 2006). When indicators load with $>.40$ on one factor and show considerably lower loadings on all other factors, indicators can be unambiguously assigned (Homburg & Giering, 1996). Such a pattern of factor loadings can be interpreted as a first indication of convergent and discriminant validity of the constructs under analysis (Homburg & Giering, 1996). Still, an EFA does not explicitly test for unidimensionality of the hypothetical constructs in question (Gerbing & Anderson, 1988).

While first generation methods provide important insights into the reliability and validity of constructs, they have been criticized for mainly two shortcomings: Firstly, first generation methods do not allow for inferential statistical tests, but aim to achieve certain threshold levels for their test scores which have been established as good practice (Cortina, 1993; Gerbing & Anderson, 1988). Secondly, first generation methods are based on limiting assumptions. Measurement error is assumed to be

negligible and thereby not explicitly scrutinized. For instance, the assumption of equal reliabilities in calculating Cronbach's Alpha precludes a separate assessment of indicator measurement error (Homburg & Giering, 1996).

Second generation methods

Confirmatory factor analysis

Based on the method of *confirmatory factor analysis* (CFA) which was developed in the mid-1960s by Karl G. Jöreskog (Jöreskog, 1966, 1969), a number of second-generation tests have been developed which are less prone to the above mentioned deficits of first generation methods (Bagozzi & Phillips, 1982; Gerbing & Anderson, 1988).

In contrast to EFA, CFA requires an ex-ante specification of the number of factors and the assignment of indicators which are expected to load highly on them (Hair et al., 2006). Thus, CFA is performed on the basis of a measurement theory or *measurement model* which specifies how observable indicators represent a latent construct. As such, a measurement model represents a special case of a general structural equation model (SEM). In contrast to EFA, the measurement errors are explicitly accounted for by variables which are assigned to each indicator. Also, it is assumed that indicators exclusively load on factors to which they have been assigned. The standard measurement model of CFA further assumes that the construct is causal for the indicator scores. The ability of CFA to explicitly extract measurement error from the observed score represents a significant improvement over first generation methods. Still, the information gained by CFA is limited in that measurement error is extracted as a single score without differentiating its two separate components, systematic and random error (Bagozzi, Yi, & Phillips, 1991). Thus, CFA and its derived test criteria are especially apt for assessments of construct validity. For reliability assessments, first generation methods will remain the method of choice.

CFA can be conducted on the basis of either correlation or covariance matrices of the observed data. While correlation matrices consist of standardized estimates and thus ease interpretation, they carry three major disadvantages. Firstly, their use can lead

to errors in the calculation of standard errors (Cudeck, 1989). Secondly, their standardized output is not useful whenever absolute magnitudes of values are of interest. And, thirdly, whenever multiple samples are compared, covariances will be needed as input. Not least, correlation matrices can easily be computed from covariance matrices but not vice versa. In conclusion, covariance matrices will be chosen in the present research because of the flexibility they provide for subsequent analyses (Hair et al., 2006).

CFA is performed by first computing a covariance matrix from the observed data matrix. Then, an estimation procedure attempts to find path coefficients which lead to an estimated covariance matrix that best reproduces the original observed covariance matrix for the specified measurement model. Several different estimation procedures are available which aim to achieve this goal by minimizing the difference between the estimated and the observed covariance matrices, e.g. maximum likelihood estimation (MLE), weighted least squares (WLS), generalized least squares (GLS) and asymptotically distribution free (ADF) estimation. Among them, the most widely used procedure is MLE and has proven robust, even when multivariate normality assumptions are moderately violated (Olsson, Foss, & Breivik, 2004; Olsson, Foss, Troye, & Howell, 2000). Also, MLE has been shown to work well with sample sizes of $n=100-400$ (Hair, Anderson, Tatham, & Black, 1998; Steenkamp & van Trijp, 1991). In conclusion, the choice of MLE in the form of a full information likelihood (FIML) estimation method appears to be consistent with the dataset underlying this study.

Differences between the observed and estimated covariance matrices have been shown to follow a χ^2 -statistics distribution (Hair et al., 2006). As a consequence, the output of a CFA lends itself to evaluation by means of inferential statistical tests. The range of different tests can be broadly classified into two categories, i.e. global and partial fit measures. While *global fit measures* assess how well the overall measurement model is able to reproduce a covariance matrix which fits the observed covariance matrix, *partial fit measures* inform as to how the individual parts of the measurement model, i.e. its indicators, contribute to this goodness of fit (Homburg & Giering, 1996). Global measures can again be differentiated into absolute and incremental indices of fit (Hair et al., 2006; Hu & Bentler, 1995).

Global fit measures (absolute)

Absolute fit indices provide a direct measure of how well a specified model reproduces the observed data, without comparing the specified model to other alternative models. Among them, three absolute fit indices, the χ^2 statistic (χ^2), the goodness-of-fit index (GFI) and the root mean square error of approximation (RMSEA) deserve closer attention, following standard research practice (Hair et al., 2006). The root mean square residual (RMSR) measure will not be considered here, as RMSEA uses a comparable approach for correcting the bias of χ^2 , but draws statistical inferences from a known statistical distribution in contrast to RMSR which works from the underlying sample (Hu & Bentler, 1999).

 χ^2 statistic

The χ^2 *statistic* is the most fundamental absolute fit index and tests the null-hypothesis that the estimated covariance matrix does not deviate from the observed covariance matrix. It is computed as follows:

$$\chi^2 = (N - 1)(S - \Sigma_k)$$

With: χ^2 = Chi-Square measure of fit

N = Sample size

S = Observed covariance matrix

Σ_k = Estimated covariance matrix

Thus, only if both matrices are equal, χ^2 scores will be zero. Else, a positive χ^2 will result. As the χ^2 distribution and its critical values are known, the probability (p) can be determined that both matrices are indeed equal in a given population. Good fit is signalled when the χ^2 score is low enough not to represent significant differences between both matrices ($p > 0.05$) (Homburg & Giering, 1996).

The χ^2 test is plagued by two major limitations, though. Firstly, as the above formula shows, the χ^2 score is dependent on sample size. Tests with very large (very small) underlying sample sizes may be falsely rejected (accepted). This stands in stark contrast to the general estimation benefits of larger sample sizes (Hair et al., 2006). Secondly, the χ^2 score is likely to rise with increasing numbers of indicators. Hence, the more indicators a model carries, the more the χ^2 test will be biased against it

(Herzog, Boonsma, & Reinecke, 2007; Kenny & McCoach, 2003). This may lead to erroneous results, because, in reality, using more indicators often improves the quality of a measurement model (Hair et al., 2006). Drawing on simulation research studies in SEM (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004), Hair et al. conclude that for a study with a sample size below 250, insignificant results can be achieved when the number of observed indicators does not exceed 12. Otherwise, the χ^2 test may often produce significant p-values in spite of good model fit (Hair et al., 2006). Finally, a χ^2 test only offers a dichotomous decision strategy of acceptance or rejection, but does not allow to quantify the degree of fit (Hu & Bentler, 1995).

In view of such severe limitations, it has been recommended to use the χ^2 test as an initial descriptive fit measure in a somewhat standardized way which accounts for the level of complexity, i.e. the degrees of freedom present in the model (χ^2/df) (Bagozzi & Baumgartner, 1994). Good fit is indicated when this ratio does not exceed a value of 3 (Homburg & Giering, 1996).

(Adjusted) Goodness-of-fit

The *goodness-of-fit* (GFI) index was developed as a measure which is less sensitive to sample size (Jöreskog & Sörbom, 1984). Instead of measuring absolute covariance differences, GFI measures the relative amount of variances and covariances in S which are accounted for by Σ (see formula 9.2.) (Hu & Bentler, 1995). As such, GFI is conceptually analogous to R^2 in regression analysis (Hu & Bentler, 1995). As GFI does not address sensitivity to model complexity, the *adjusted goodness-of-fit* (AGFI) was developed. AGFI penalizes complex models in adjusting GFI by a ratio which is computed as the degrees of freedom used in the measurement model divided by the total degrees of freedom which are available. The values of both GFI and AGFI range between 0 and 1 with an (A)GFI = 1 indicating that the measurement model perfectly replicates empirical variances and covariances. It is important to notice that both goodness-of-fit indices do not rely on inferential statistical tests in assessing a model, but allow for comparison of the achieved score to thresholds levels which have been established in research practice. While scores as high as .95 (Hoelter, 1983) have been argued to represent good model fit, a model is generally accepted, when GFI achieves a score of no less than 0.90 (Homburg & Giering, 1996). AGFI will typically achieve lower scores than

GFI in proportion to model complexity, but should also reach at least .90 (Homburg & Giering, 1996). This level will be aimed for in this study and may be considered conservative (Bagozzi & Yi, 1988). In addition to their character of being somewhat arbitrary fit measures, GFI and AGFI are not completely immune to different sample sizes and model complexity. Both tend to fall with smaller samples and smaller number of indicators involved (Anderson & Gerbing, 1984; Marsh, Balla, & McDonald, 1988).

Root mean square error of approximation

The *root mean square error of approximation* (RMSEA) represents a second approach to remedy the sensitivity of the χ^2 test towards sample size and numbers of indicators. RMSEA is computed by, firstly, subtracting the degrees of freedom from χ^2 as an attempt to correct for model complexity. Secondly, the resulting score is divided by $(N-1)$ to correct for the effect of sample size. Taking the root completes the calculation. RMSEA is superior to a similar procedure, known as the root mean square residual (RMSR) estimation, in having a known distribution (Hu & Bentler, 1999) which allows to, firstly, assess how well a model fits a population beyond the underlying dataset and, secondly, to comparatively evaluate the fit of different models (Hair et al., 2006). As RMSEA rises with decreasing model fit, it has been termed a 'badness-of-fit' measure (Hair et al., 2006). Although it is still a matter of debate, what levels of RMSEA indicate appropriate fit, a score below 0.10 is usually accepted (Hair et al., 2006).

Global fit measures (incremental)

In contrast to absolute global fit indices, *incremental global fit indices* compare the specified model against a baseline model. The baseline model which underlies all incremental indices proposed in this study is the null model which assumes zero correlations among indicators (Sobel & Bohrnstedt, 1985). A null model, thus, consists of single-indicator constructs and does not include error terms. Incremental fit indices, generally speaking, reflect the improvement of fit which is achieved by specifying a more complex model than the null model (Hair et al., 2006).

Incremental fit indices have further been differentiated into three different types, primarily according to their distributional assumptions (Hu & Bentler, 1995). As only a

limited number of incremental indices can be reported and discussed in such a study as the present one, a further categorization into different types does not seem appropriate here, but differences between the indices will be taken up in their respective discussion. The two most frequently used incremental indices will also be used in this study. They are the comparative fit index (CFI) and the Tucker-Lewis Index (TLI) (Hair et al., 2006; Hu & Bentler, 1999).

Comparative fit index

The *comparative fit index* (CFI) (Bentler & Bonett, 1980) represents a modification of the simpler normed fit index (NFI) (Bentler & Bonett, 1980). NFI expresses the proportion of total covariance explained by a specified model, relative to the null model (Hu & Bentler, 1995). When correcting for the models' complexity by subtracting their respective degrees freedom, the Bentler's fit index (BFI) (Bentler, 1990) results. When norming BFI to the range between 0 and 1, CFI is obtained (Hu & Bentler, 1995). As follows from the above, higher CFI values signal better fit. Scores of less than .90 are generally not interpreted as acceptable fit (Hair et al., 2006).

Tucker-Lewis index

The *Tucker-Lewis Index* (TLI) (Tucker & Lewis, 1973) represents a comparison between the χ^2/df ratios of the specified and the null model. It is not normed and thus not confined to the range between 0 and 1. Increasing scores signal better model fit. As a conservative orientation for good model fit a value of at least .90 has been advocated (Bagozzi & Yi, 1988). Although being one of the first incremental fit indices, TLI has to this day proven relatively robust to sample size (Marsh et al., 1988). Also, TLI explicitly accounts for the different degree of model complexity.

In summary, starting from the insight that the most straightforward measure of global model fit, χ^2 , may be subject to severe limitations, a series of additional absolute and incremental global fit indices have been proposed which attempt to correct for sample size and model complexity. While these indices may provide enhanced procedures of fit assessment, they still do not allow to unambiguously discriminate between acceptably and unacceptably specified models. A careful and somewhat subjective consideration will still be necessary when assessing model fit for two major reasons.

Firstly, the use of single cut-off values, such as .90 for many indices, still carries an ad-hoc character and is not statistically grounded (Hair et al., 2006). Thus, it is hardly conceivable, why a model with a fit index just below .90 should be rejected outright. More recently, simulation research has evidenced the danger of the opposite, i.e. unconditionally accepting a model, when a certain threshold index level has been met. It was shown that under certain circumstances, incremental fit indices with values above the .90 cut-off may result even from severely misspecified models (Hu & Bentler, 1999). Secondly, although many of the above mentioned indices go a long way in correcting for sample and model influences, they are still not immune to them (Hu & Bentler, 1995). For instance, most goodness-of-fit indices punish for adding indicators and tend to purport a lower fit. Others, such as RMSEA, reward for a larger number of indicators and report a better fit (Kenny & McCoach, 2003). Lastly, fit indices can be influenced by differences in the distribution of the underlying dataset (Hair et al., 2006).

In view of this ambiguity, the two following recommendations (Hair et al., 2006) have been adopted for the use of global fit indices in this study: Firstly, reporting at least three to four indices of different types has been suggested in order to provide adequate evidence of good model fit. These indices should include χ^2 , its associated *df*, at least one absolute and one incremental index, with one of them being a badness-of-fit index. In consequence, a model reporting χ^2 , its associated *df*, CFI and RMSEA could deliver enough information (Hair et al., 2006). This thesis follows this guidance and additionally report TLI for its robustness. Secondly, it has been recommended to apply stricter criteria towards simpler models and smaller samples than larger samples and complex models (Hair et al., 2006). The complexity and sample size will thus be taken into account when judging model fit in this study.

Partial fit measures

After having discussed measures which assess the validity of the overall measurement model, the following section will focus on approaches to analyze its partial structures. The first three measures discussed below are indicative of how much variance the indicators of a construct share in common. As such, they provide evidence for convergent validity. Before making convergent validity claims on the basis of the above measures, though, the significance of all underlying indicator path

coefficients need to be ensured (Bagozzi et al., 1991). This may typically be achieved by means of a classic t-test assessing the null-hypothesis for the path coefficient of each indicator (Homburg & Giering, 1996). The fourth measure, finally, assesses the discriminant validity of a focal construct in relation to other constructs.

Indicator reliability

The *indicator reliability* (IR) which is also often referred to as squared multiple correlation, measures how much of an indicator's variance can be explained by its assigned factor (Hair et al., 2006). Residual, unexplained variance is captured by the indicator's error term. In a congeneric model, i.e. a model in which each indicator loads on only one factor (Hair et al., 2006), the indicator reliability is computed as the square of the factor loading. High scores of IR across a construct's indicators point to convergent validity, because the indicators appear to converge on a common point (Hair et al., 2006). IR ranges between 0 and 1, with a value of 1 representing a perfectly reliable measurement without random error. This study will in most analyses adopt a more conservative approach which aims at reaching an IR of at least .40 (Homburg & Giering, 1996). This is consistent with the demand that factor loadings in CFA should be statistically significant and at least exceed .40 (Homburg & Giering, 1996), or, ideally, .70 (Hair et al., 2006).

Construct reliability

If IR measures the reliability of single indicators, the *construct reliability* (CR) focuses on the construct and indicates how consistently it is represented by all of its indicators (Fornell & Larcker, 1981). While the appropriate choice among different reliability estimates has been a matter of debate (Bacon et al., 1995), CR is usually reported in structural equation modelling (Hair et al., 2006). CR ranges between 0 and 1, with a value of 1 indicating the absence of any measurement error variance. A score of .70 or more can be interpreted as evidencing a high degree of internal consistency, while CR levels above .60 may still be acceptable (Hair et al., 2006).

Average variance extracted

Similarly to CR, the *average variance extracted* (AVE) also indicates how well the construct is represented by all of its indicators (Fornell & Larcker, 1981). AVE shows how much variance is captured by the construct relative to the overall variance. AVE

is normed and ranges between 0 and 1 with higher scores indicating higher convergent validities. A minimal AVE score of .50 has been suggested, based on the notion that the variance captured by the construct should exceed the variance that is attributable to measurement error (Fornell & Larcker, 1981).

Fornell-Larcker-Criterion

The above approaches provide tools to comprehensively assess the convergent validity of a single-factorial construct separately from other constructs. A criterion is missing which enables the assessment of the construct's discriminant validity when linked to other constructs in larger models. Discriminant validity may commonly be tested in two ways. The first approach involves fixing the correlation between two constructs of interest and comparing the overall model fit before and after the restriction (Anderson & Gerbing, 1988; Bagozzi & Phillips, 1982). This approach has been criticized as a weak test of discriminant validity, because correlations as high as .90 between two constructs can still produce significant fit differences and thus erroneously indicate high discriminant validity (Hair et al., 2006). The second approach, known as the *Fornell-Larcker criterion* (FLC), compares a construct's AVE and its squared correlations with all other constructs present in the model. Based on the notion that a construct should explain its own indicators better than it explains other constructs, discriminant validity is accepted, when its AVEs exceeds all of its squared correlations with other constructs (Fornell & Larcker, 1981; Hair et al., 2006; Homburg & Giering, 1996). This can be easily shown when dividing the construct's AVE by the construct's largest squared correlation with any other construct in the model. When this ratio, the Fornell-Larcker ratio (FLR), remains below a value 1, the FLC is fulfilled and discriminant validity of the construct can be accepted.

In summary, this chapter has proposed a series of measures which allow for testing reliabilities and validities of parts of the measurement model as well the fit of the complete model with the underlying empirical data. The following table 8.1. summarizes the developed measures as well as their respective target scores:

First generation measures	Target score
Cronbach's Alpha (CA)	≥ .60
EFA factor loadings (EFAL)	≥ .40
Second generation measures	Target score
Global fit measures (absolute)	
p (χ^2)	> .05
X ² / df	≤ 3.0
Goodness of fit (GFI)	≥ .90
Adjusted goodness of fit (AGFI)	≥ .90
Root mean square error of approximation (RMSEA)	≤ .10
Global fit indeces (incremental)	
Tucker-Lewis Index (TLI)	≥ .90
Comparative fit index (CFI)	≥ .90
Partial fit measures	
Indicator reliability (IR)	≥ .40
Construct reliability (CR)	≥ .70
Average variance extracted (AVE)	≥ .50
Fornell-Larcker ratiio (FLR)	≤ 1.0

Table 8.1: Target scores for constructs and models

Construct development and validation process

Having laid out criteria to establish the reliability and validity of constructs as well as the fit of complete models, this section now focuses on the specific process which is followed in this thesis. The process presented here contains four phases and is adapted from the sequence proposed by Homburg and Giering (Homburg & Giering, 1996).

In a first phase, a fine-grained and comprehensive understanding of each construct's *conceptual domain* was developed by assessing it from different angles. Literature reviews and expert interviews served as suitable methods. In a second phase, a *pre-test* was performed which assessed the proposed construct indicators for their comprehensibility and definitional accuracy. The pre-test, thus, served to eliminate ambiguously worded or conceptually irrelevant indicators. In a third phase, the *data* for the quantitative analysis of the construct was acquired by means of a questionnaire containing the pre-tested indicator set (see chapter 3.3.). In the fourth

and last phase, the constructs' reliability and validity were analyzed based on the acquired data. This final phase consisted of the following steps:

Step I intended to detect the number and structure of factors underlying a set of indicators by means of an exploratory factor analysis (EFA). Before the EFA was carried out, tests were performed which ensured that the underlying, observed data was adequate for a factor analysis. Firstly, the Kaiser-Meyer-Olkin criterion (KMO) was computed which evaluated whether the construct indicators could be grouped into a smaller set of underlying factors. The KMO should reach at least .50, with values above .80 indicating excellent sampling adequacy (Kaiser & Rice, 1974). Secondly, a Bartlett-Test was performed for each construct which compared the correlation matrix of the underlying data to an identity matrix. A significant χ^2 -statistic with $p < .05$ indicated that the correlation matrix of the observed data was not random and, thus, lended itself to an EFA. Only then, the EFA was carried out in order to ensure that the intended indicators can be unambiguously assigned to their factors. Criteria which were observed for evaluating EFA results included each indicator's factor loadings and communalities, as well as the construct's overall Eigenvalue, Variance explained and Cronbach's Alpha. Indicators which clearly failed to meet the criteria are eliminated. In such instances, the EFA was repeated with the reduced set of items until all evaluation criteria were met (Churchill, 1979; Gerbing & Anderson, 1988). The tables in the following chapter show the final EFA results for each construct, including their reliability (Cronbach's alpha). Step I, thus, provided first insights whether and to what extent the intended constructs were recognized by the variables.

Step II aimed at ensuring the convergent and discriminant validity of the constructs. Towards this goal, a confirmatory factor analysis (CFA) was performed including all constructs that constitute the hypothesized, structural model. First, each construct was assessed individually by means of the partial fit measures which have been described above. Specifically, indicator reliabilities, construct variance, average variance extracted and the construct reliability were examined. If several target scores were clearly missed, indicators with the lowest indicator reliabilities were iteratively eliminated. In such instances, the CFA was repeated with the reduced set of items until all evaluation criteria were met. Second, it was evaluated by means of

the Fornell-Larcker criterion whether the validity of the developed constructs held within the context of all other constructs in the model. Again, if the criteria were not met, a CFA was repeated with the reduced item set. Finally, global absolute and incremental fit measures, including χ^2/df , RMSEA, CFI, TLI and NFI, were computed in order to evaluate the fit of the overall measurement model. The tables in the following chapter show the final CFA results for each construct as well for the overall measurement model. Step II thus ensured the convergent and discriminant validity of the individual constructs as well as the fit of the overall measurement model.

Lastly, after convergent and discriminant validity had been ensured, the constructs' nomological validity was assessed. This was performed within the nomological net of the larger models in the previous chapters.

8.3. Construct items and validation: Chapter 3

Overview of construct items and item codes

This section details the construct items which were used in the third chapter. In the original questionnaire items, the brand name and logo of the innovation was used in order to make the image of the innovation more salient. It is here omitted for reasons of confidentiality. Each item is provided with its specific code (e.g. v211). The codes are used instead of the full item wording in subsequent tables of EFA and CFA, for purposes of clarity and brevity of presentation.

Both studies (Inno1/Inno2) used the same items. Thus, the item wording is only presented once for both studies. However, as each study addressed a different innovation, separate EFA and CFA were conducted. In order to be able to distinguish EFA and CFA results of both studies, the last digit of the item codes indicate to which study the item refers. Item codes ending with the number '1' refer to Inno1, while codes ending with the number '2' refer to Inno2. For example (see below), 'v211' gauged whether participants thought that Inno1 leads to HealthCo becoming more different from its competitors, and 'v212' addressed the same question for Inno2.

Distinctiveness effect

Participants indicated to what extent they agreed with the following statements (5-point scale, anchored with 'strongly agree' / 'strongly disagree').

Item wording	Item code (Inno1)	Item code (Inno2)
[This innovation] leads to...		
...HealthCo becoming more different from its competitors.	v211	v212
...HealthCo becoming more unique, compared to its competitors.	v221	v222
...HealthCo standing out among its competitors.	v231	v232

Table 8.2: Construct items for 'Distinctiveness effect'

Incongruence effect

Participants indicated to what extent they agreed with the following statements (5-point scale, anchored with 'strongly agree' / 'strongly disagree').

Item wording	Item code (Inno1)	Item code (Inno2)
[This innovation] leads to...		
...HealthCo increasingly standing for contradictory things.	V311	V312
...HealthCo's goals becoming more conflicting.	V321	V322
...HealthCo's values becoming less compatible with each other.	v341	V342
...HealthCo sending more mixed messages concerning what it cares about.	V351	V352

Table 8.3: Construct items for 'Incongruence effect'

Prestige effect

Participants indicated to what extent they agreed with the following statements (5-point scale, anchored with 'strongly agree' / 'strongly disagree').

Item wording	Item code (Inno1)	Item code (Inno2)
[This innovation] leads to...		
...HealthCo being, overall, considered better by general practitioners.	V511	V512
...general practitioners thinking more highly of HealthCo.	V521	V522
...HealthCo's values becoming less compatible with each other.	V531	V532

Table 8.4: Construct items for 'Prestige effect'

Identification with an innovation (cognitive)

Participants were asked to rate the degree of overlap between their self-image and the perceived image of the innovation on a visual item (v711) and a verbal item (v811). The items were introduced by the following short text which had proven useful in previous applications of the scale (Bartel, 2001; Bergami & Bagozzi, 2000) and served to clarify the identification and identity terminology:

We identify strongly with an innovation when we perceive a great amount of overlap between our ideas about who we are as a person and what we stand for (i.e. our self image) and of what the innovation stands for (i.e. the image we have of the innovation).




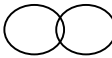





Item wording

Please look at the graph with the circles. Imagine that the left circles represent your personal identity and that the right circles stand for the identity of [the innovation].

Please indicate which case (1-8) best describes the level of overlap between your identity and [this innovation's] identity.

Item code (Inno1): v711

Item code (Inno2): v712

	ME	INNO1	
1 Far Apart			<input type="checkbox"/>
2 Close but Separate			<input type="checkbox"/>
3 Very Small Overlap			<input type="checkbox"/>
4 Small Overlap			<input type="checkbox"/>
5 Moderate Overlap			<input type="checkbox"/>
6 Large Overlap			<input type="checkbox"/>
7 Very Large Overlap			<input type="checkbox"/>
8 Complete Overlap			<input type="checkbox"/>

Item wording

To what extent does your own sense of who you are (i.e. your personal identity) overlap with your sense of what [this innovation] represents (i.e. the innovation's identity)? (1=not at all, 8=completely)

Item code (Inno1): v811

Item code (Inno2): v812

Table 8.5: Construct items for 'Identification with an innovation (cognitive)'

Step I: Exploratory factor analysis of individual constructs (Inno1)

Item code	Factor 1	Communality
v211	0.89	0.79
v221	0.90	0.81
v231	0.94	0.89
Eigenvalue	2.66	
Variance expl.	83.00	
Cronbach's Alpha	0.94	
KMO-Criterion		0.76
Bartlett-Test	(χ^2)	386.64
	(d.f.)	3
	(significance)	$p < .001$

Table 8.6: EFA results for distinctiveness effect (Inno1)

Item code	Factor 1	Communality
v311	0.72	0.52
v321	0.84	0.70
v341	0.89	0.79
v351	0.74	0.55
Eigenvalue	2.91	
Variance expl.	64.08	
Cronbach's Alpha	0.88	
KMO-Criterion		0.81
Bartlett-Test	(χ^2)	310.01
	(d.f.)	6
	(significance)	$p < .001$

Table 8.7: EFA results for incongruence effect (Inno1)

Item code	Factor 1	Communality
v511	0.85	0.72
v521	0.89	0.79
v531	0.94	0.89
Eigenvalue	2.60	
Variance expl.	80.13	
Cronbach's Alpha	0.92	
KMO-Criterion		0.75
Bartlett-Test	(χ^2)	346.17
	(d.f.)	3
	(significance)	$p < .001$

Table 8.8: EFA results for prestige effect (Inno1)

Item code	Factor 1	Communality
v711	0.92	0.85
v811	0.92	0.85
Eigenvalue	1.85	
Variance expl.	85.29	
Cronbach's Alpha	0.92	
KMO-Criterion		0.50
Bartlett-Test	(χ^2)	196.59
	(d.f.)	1
	(significance)	$p < .001$

Table 8.9: EFA results for identification with an innovation (Inno1)

Step II: Confirmatory factor analysis of the complete model (Inno1)

Variables	$\chi^2/d.f.$	<i>p</i>	RMSEA	CFI	TLI	NFI
1. Null model	21.10	0.00	0.37	0.00	0.00	0.00
2. Measurement model (CFA)	1.24	0.13	0.04	0.99	0.99	0.96

n=146 (excluding missing values).

Table 8.10: Confirmatory factor analysis – model fit (Inno1)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
211	0.24	1.00	0.89	0.50
221	0.25	1.02	0.89	0.51
231	0.12	1.04	0.95	0.52
Construct variance (Φ)				0.96
Average variance extracted				0.83
Construct reliability				0.94
Intercorrelation (max.)				-0.56
Fornell-Larcker-Ratio				0.38

Table 8.11: CFA results for distinctiveness effect (Inno1)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
311	0.70	1.00	0.73	0.50
321	0.46	1.18	0.84	0.58
341	0.37	1.12	0.88	0.56
351	0.77	1.13	0.76	0.56
Construct variance (Φ)				0.81
Average variance extracted				0.63
Construct reliability				0.87
Intercorrelation (max.)				-0.56
Fornell-Larcker-Ratio				0.49

Table 8.12: CFA results for incongruence effect (Inno1)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
511	0.23	1.00	0.85	0.50
521	0.17	1.13	0.90	0.56
531	0.13	1.18	0.93	0.58
Construct variance (Φ)				0.61
Average variance extracted				0.81
Construct reliability				0.93
Intercorrelation (max.)				0.56
Fornell-Larcker-Ratio				0.39

Table 8.13: CFA results for prestige effect (Inno1)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
711	0.35	1.00	0.88	0.50
811	0.19	1.21	0.95	0.59
Construct variance (Φ)				1.22
Average variance extracted				0.85
Construct reliability				0.92
Intercorrelation (max.)				0.56
Fornell-Larcker-Ratio				0.37

Table 8.14: CFA results for identification with an innovation (Inno1)

Step I: Exploratory factor analysis of individual constructs (Inno2)

Item code	Factor 1	Communality
v212	0.88	0.78
v222	0.97	0.95
v232	0.95	0.91
Eigenvalue	2.76	
Variance expl.	87.99	
Cronbach's Alpha	0.96	
KMO-Criterion		0.75
Bartlett-Test	(χ^2)	503.33
	(d.f.)	3
	(significance)	$p < .001$

Table 8.15: EFA results for distinctiveness effect (Inno2)

Item code	Factor 1	Communality
v312	0.74	0.54
v322	0.88	0.77
v342	0.87	0.75
v352	0.71	0.50
Eigenvalue	2.91	
Variance expl.	64.16	
Cronbach's Alpha	0.88	
KMO-Criterion		0.82
Bartlett-Test	(χ^2)	311.36
	(d.f.)	6
	(significance)	$p < .001$

Table 8.16: EFA results for incongruence effect (Inno2)

Item code	Factor 1	Communality
v512	0.82	0.67
v522	0.86	0.74
v532	0.95	0.89
Eigenvalue	2.53	
Variance expl.	76.73	
Cronbach's Alpha	0.91	
KMO-Criterion		0.73
Bartlett-Test	(χ^2)	305.67
	(d.f.)	3
	(significance)	$p < .001$

Table 8.17: EFA results for prestige effect (Inno2)

Item code	Factor 1	Communality
v712	0.93	0.87
v812	0.93	0.87
Eigenvalue	1.87	
Variance expl.	86.52	
Cronbach's Alpha	0.93	
KMO-Criterion		0.50
Bartlett-Test	(χ^2)	210.09
	(d.f.)	1
	(significance)	$p < .001$

Table 8.18: EFA results for identification with an innovation (Inno2)

Step II: Confirmatory factor analysis of the complete model (Inno2)

Variables	$\chi^2/d.f.$	<i>p</i>	RMSEA	CFI	TLI	NFI
1. Null model	22.76	0.00	0.39	0.00	0.00	0.00
2. Measurement model (CFA)	0.88	0.71	0.00	1.00	1.01	0.97

n=146 (excluding missing values).

Table 8.19: Confirmatory factor analysis – model fit (Inno2)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
212	0.35	1.00	0.90	0.50
222	0.12	1.09	0.97	0.54
232	0.11	1.09	0.97	0.54
Construct variance (Φ)				1.4
Average variance extracted				0.89
Construct reliability				0.96
Intercorrelation (max.)				-0.54
Fornell-Larcker-Ratio				0.33

Table 8.20: CFA results for distinctiveness effect (Inno2)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
312	0.86	1.00	0.75	0.50
322	0.45	1.20	0.88	0.59
342	0.53	1.20	0.86	0.59
352	1.15	1.04	0.71	0.52
Construct variance (Φ)				1.08
Average variance extracted				0.64
Construct reliability				0.88
Intercorrelation (max.)				-0.54
Fornell-Larcker-Ratio				0.45

Table 8.21: CFA results for incongruence effect (Inno2)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
512	0.31	1.00	0.82	0.50
522	0.28	1.09	0.85	0.54
532	0.11	1.15	0.94	0.57
Construct variance (Φ)				0.64
Average variance extracted				0.76
Construct reliability				0.91
Intercorrelation (max.)				0.54
Fornell-Larcker-Ratio				0.38

Table 8.22: CFA results for prestige effect (Inno2)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
712	0.6	1.00	0.84	0.50
812	0.36	1.03	0.9	0.51
Construct variance (Φ)				3.10
Average variance extracted				0.87
Construct reliability				0.93
Intercorrelation (max.)				0.54
Fornell-Larcker-Ratio				0.34

Table 8.23: CFA results for identification with an innovation (Inno2)

Kolmogorov-Smirnoff Test (Inno1)

Kolmogorov-Smirnoff test on standardized residuals		
Distribution characteristics		
Mean		0.09
Standard deviation		0.88
Extreme differences		
Absolute		0.06
Positive		0.03
Negative		-0.06
Kolmogorov-Smirnoff-Z		0.65
Asymptotic significance (two-sided)		0.79

n=129 after pairwise deletion; testing for normal distribution

Table 8.24: Distribution testing of standardized residuals (Inno1)

Kolmogorov-Smirnoff Test (Inno2) (A2)

Kolmogorov-Smirnoff test on standardized residuals		
Distribution characteristics		
Mean		-0.03
Standard deviation		0.98
Extreme differences		
Absolute		0.07
Positive		0.04
Negative		-0.07
Kolmogorov-Smirnoff-Z		0.80
Asymptotic significance (two-sided)		0.54

n=130 after pairwise deletion; testing for normal distribution

Table 8.25: Distribution testing of standardized residuals (Inno2)

8.4. Construct items and validation: Chapter 4

Overview of construct items and item codes

This section details the construct items which were used in the fourth chapter. As previously, each item is provided with its specific code (e.g. v111). The codes are used instead of the full item wording in subsequent EFA and CFA tables for purposes of clarity and brevity of presentation. Only one construct, innovation prototypicality, was introduced in this chapter. All other constructs have already been detailed in chapter 8.3. The brand name of the innovations was used in the questionnaire items, but is here omitted for reasons of confidentiality.

Innovation prototypicality

Participants were asked to indicate to what extent they agreed with the following statement (5-point scale, anchored with 'strongly agree' / 'strongly disagree').

Item wording	Item code (Inno1)	Item code (Inno2)
[This innovation] is highly typical for HealthCo.	v111	v112
When I think of [this innovation], my image of this innovation matches well a trustworthy external image of HealthCo.	v29061	v29062
When I think of [this innovation], my image of this innovation matches well HealthCo's deeply rooted values and ideals.	v29071	v29072

Table 8.26: Construct items for 'Innovation prototypicality'

Step I: Exploratory factor analysis of individual constructs (Inno1)

Item code	Factor 1	Communality
v111	0.50	0.25
v29061	0.75	0.57
v29071	0.95	0.91
Eigenvalue	2.06	
Variance expl.	57.31	
Cronbach's Alpha	0.77	
KMO-Criterion		0.62
Bartlett-Test	(χ^2)	146.90
	(d.f.)	3
	(significance)	$p < .001$

Table 8.27: EFA results for innovation prototypicality (3 items) (Inno1)

Item code	Factor 1	Communality
v29061	0.85	0.72
v29071	0.85	0.72
Eigenvalue	1.72	
Variance expl.	71.62	
Cronbach's Alpha	0.83	
KMO-Criterion		0.50
Bartlett-Test	(χ^2)	109.32
	(d.f.)	1
	(significance)	$p < .001$

Table 8.28: EFA results for innovation prototypicality (2 items) (Inno1)

Step II: Confirmatory factor analysis of the complete model (Inno1)

Variables	$\chi^2/d.f.$	<i>p</i>	RMSEA	CFI	TLI	NFI
1. Null model	14.10	0.00	0.29	0.00	0.00	0.00
2. Measurement model (CFA)	1.27	0.05	0.04	0.99	0.98	0.94

n=154

Table 8.29: Confirmatory factor analysis – model fit (Inno1)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
v111	0.69	0.63	0.55	0.28
v29061	0.36	1.00	0.82	0.50
v29071	0.34	1.06	0.85	0.53
Construct variance (Φ)				0.76
Average variance extracted				0.58
Construct reliability				0.80
Intercorrelation (max.)				-0.79
Fornell-Larcker-Ratio				1.08

n=154

Table 8.30: CFA results for innovation prototypicality (3 items) (Inno1)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
v29061	0.32	1.00	0.85	0.50
v29071	0.34	1.04	0.85	0.52
Construct variance (Φ)				0.80
Average variance extracted				0.72
Construct reliability				0.83
Intercorrelation (max.)				-0.78
Fornell-Larcker-Ratio				0.85

n=154

Table 8.31: CFA results for innovation prototypicality (2 items) (Inno1)

Step I: Exploratory factor analysis of individual constructs (Inno2)

Item code	Factor 1	Communality
v112	0.61	0.37
v29062	0.85	0.73
v29072	0.94	0.89
Eigenvalue	2.28	
Variance expl.	66.44	
Cronbach's Alpha	0.83	
KMO-Criterion		0.66
Bartlett-Test	(χ^2)	219.20
	(d.f.)	3
	(significance)	$p < .001$

Table 8.32: EFA results for innovation prototypicality (3 items) (Inno2)

Item code	Factor 1	Communality
v29062	0.90	0.81
v29072	0.90	0.81
Eigenvalue	1.81	
Variance expl.	80.59	
Cronbach's Alpha	0.89	
KMO-Criterion		0.50
Bartlett-Test	(χ^2)	159.26
	(d.f.)	1
	(significance)	$p < .001$

Table 8.33: EFA results for innovation prototypicality (2 items) (Inno2)

Step II: Confirmatory factor analysis of the complete model (Inno2)

Variables	$\chi^2/d.f.$	<i>p</i>	RMSEA	CFI	TLI	NFI
1. Null model	14.77	0.00	0.30	0.00	0.00	0.00
2. Measurement model (CFA)	0.98	0.53	0.00	1.00	1.00	0.96

n=154

Table 8.34: Confirmatory factor analysis – model fit (Inno2)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
v112	0.97	0.79	0.66	0.38
v29062	0.42	1.00	0.86	0.50
v29072	0.30	1.12	0.91	0.56
Construct variance (Φ)				1.22
Average variance extracted				0.68
Construct reliability				0.86
Intercorrelation (max.)				0.69
Fornell-Larcker-Ratio				0.71

n=154

Table 8.35: CFA results for innovation prototypicality (3 items) (Inno2)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
v29062	0.4	1.00	0.87	0.50
v29072	0.25	1.12	0.93	0.56
Construct variance (Φ)				1.24
Average variance extracted				0.81
Construct reliability				0.90
Intercorrelation (max.)				0.68
Fornell-Larcker-Ratio				0.57

n=154

Table 8.36: CFA results for innovation prototypicality (2 items) (Inno2)

8.5. Construct items and validation: Chapter 5

Overview of construct items and item codes

This section details the construct items and single item measures which were used in the fifth chapter. As previously, each item is provided with its specific code (e.g. v921). The codes are used instead of the full item wording in subsequent EFA and CFA tables for purposes of clarity and brevity of presentation. Only the constructs which were newly introduced in this chapter are presented here. While the brand name of the innovations had been used in the questionnaire items in order to make the image of the innovation salient, it is here omitted for reasons of confidentiality.

Identification with an innovation (affective)

Participants were asked to indicate to what extent they agreed with the following statement (5-point scale, anchored with 'strongly agree' / 'strongly disagree').

Item wording	Item code (Inno1)
When someone praises [this innovation], it feels like a personal compliment.	v921
When someone criticizes [this innovation], it feels like a personal insult.	v931
If someone destroyed [this innovation], I would feel a little bit personally attacked.	v941

Table 8.37: Construct items for 'Identification with an innovation (affective)'

Extra-role behaviour

Participants were asked to indicate to what extent they agreed with the following statement (5-point scale, anchored with 'strongly agree' / 'strongly disagree').

Item wording	Item code (Inno1)
I have engaged in voluntary actions for [this innovation] which went beyond my usual tasks as a sales representative.	v1921
I have done more than I was expected by the organization, in order to put [this innovation] onto a successful path.	v1931
For [this innovation], I have voluntarily delivered extra-effort.	v1941

Table 8.38: Construct items for 'Extra-role behaviour'

Step I: Exploratory factor analysis of individual constructs (Inno1)

Item code	Factor 1	Communality
v921	0.53	0.28
v931	0.84	0.70
v941	0.75	0.57
Eigenvalue	1.99	
Variance expl.	51.51	
Cronbach's Alpha	0.74	
KMO-Criterion		0.65
Bartlett-Test	(χ^2)	112.30
	(d.f.)	3
	(significance)	$p < .001$

Table 8.39: EFA results for affective identification with an innovation

Item code	Factor 1	Communality
v1921	0.79	0.63
v1931	0.93	0.87
v1941	0.84	0.70
Eigenvalue	2.46	
Variance expl.	73.41	
Cronbach's Alpha	0.89	
KMO-Criterion		0.73
Bartlett-Test	(χ^2)	268.16
	(d.f.)	3
	(significance)	$p < .001$

Table 8.40: EFA results for extra-role behaviour

Step II: Confirmatory factor analysis of the complete model (Inno1)

Variables	$\chi^2/d.f.$	<i>p</i>	RMSEA	CFI	TLI	NFI
1. Null model	11.25	0.00	0.26	0.00	0.00	0.00
2. Measurement model (CFA)	1.37	0.08	0.05	0.98	0.96	0.94

n=154

Table 8.41: Confirmatory factor analysis – model fit (Inno1)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
v921	0.63	0.56	0.57	0.24
v931	0.52	1.00	0.81	0.50
v941	0.53	0.83	0.75	0.41
Construct variance (Φ)				0.99
Average variance extracted				0.54
Construct reliability				0.77
Intercorrelation (max.)				0.50
Fornell-Larcker-Ratio				0.46

n=154

Table 8.42: CFA results for affective identification with an innovation (Inno1)

Item code	Measurement error var. (θ)	Unstand. loadings (λ)	Stand. factor loadings	Indicator reliability
v1921	0.38	0.93	0.80	0.46
v1931	0.12	1.00	0.93	0.50
v1941	0.32	0.99	0.84	0.49
Construct variance (Φ)				0.76
Average variance extracted				0.73
Construct reliability				0.89
Intercorrelation (max.)				0.38
Fornell-Larcker-Ratio				0.20

n=154

Table 8.43: CFA results for extra-role behaviour (Inno1)

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Innovations have become essential drivers of success for companies in most industries. However, innovative efforts often fail due to a lack of internal support. Past research has shown that internal resistance arises when employees perceive innovations as threatening the core of the organization, its identity. How employees can be led to identify with such innovations has remained largely unsolved.

Drawing on organizational psychology, this study proposes a new conceptual framework which includes an in-depth understanding of employee identification with innovations, its identity-related antecedents and its consequences. The framework is tested by means of large-scale empirical studies among more than 150 members of a leading healthcare organization. Results indicate that the proposed framework has high explanatory power for employee identification with innovations, employee behaviours and the innovations' success in the market. Based on these results, an innovation-identity toolkit is derived which enables executives to systematically pursue identification management and integrate it into their innovation management practice.

Accordingly, the present book is relevant for both academics and managers in the fields of organizational behaviour and innovation management.