10. Discussion and Implications

10.1 Introduction

This chapter discuses research results and their effect on existing knowledge. It lists the deficiencies that emerged during the study and the emerging implications for improvement in theory and practice. The purpose of this study was to investigate the role of social and individual influence on technology acceptance behaviour. This was done by investigating an individual's subjective interpretation of the situation of technological change.

The results of the frame analysis indicate that understanding the identity content of an individual serves as a navigation system towards individuals' meaning systems. This assumption was confirmed by the data that was analyzed from this study. Once an individual's meaning system can be understood through the content of its central identities, one can make sense of this individual's behaviour in the context of technological change. Distinguishing between a central group-identity vs. a central role-identity helps to determine behaviour being predominantly individualistic or conforming.

The system can be understood most effectively through the factors that stabilise an individual's work identity vs. those that destabilize. While these factors emerge as individually unique, they can be partitioned into various, overlapping typologies that emerged as typical for the analysed mechantronics designers. Comparing a new technology's qualities with an individual's unique factors that evoke feelings of stability or instability gives a lot of insight into technology acceptance behaviour.

10.2 Discussion of early acceptance vs. technology rejection

Within the analysed group of participants, those who reported an early technology adoption were the same individuals who also rejected a technology. This finding is significantly different from existing knowledge that was discussed in part I. Adoption theories have used 'innovativeness' as a relatively stable personality trait, introduced by Rogers (1995, p.252) and followed by Moore (1999, p.12). Existing models identify no correlation between what has been described as "innovators" or "early adopters" and "laggards" (ibid.; Rogers 1995, p.265); these categories were considered personalities with a different and relatively stable mindset towards technology.

The emergent data in this research leads to a different understanding: participants who actively pushed a new technology or who rejected it, felt in control of the situation and insisted on the right to act according to their individual expert opinion concerning a particular technological change. This opinion was dominated by their personal interest, which was often also beneficial for the company. Two of

those individuals were not granted the right to change the situation, even though they thought they should. They both felt personally offended and scorned, to the point where they reflected on the pros and cons of leaving the company.

This data, which contradicts existing theory, are significant, because they offer new possibilities of action that have not been considered before. Traditionally, laggards and rejecters have been ignored in marketing, sales and change management activities. They have been considered too much effort for too little benefit. However, these findings indicate that fast and enthusiastic technology endorsement might be applicable by modifying the situation slightly but creatively, so these individuals attain a personally relevant benefit.

This finding however, might be industry and profession specific. Rogers as well as Moore describe technology rejecters as individuals who qualify as "technophobics" (Brosnan, 1998, 1999). This research did not discover any form of technophobic behaviour, which is characterised by a rejection of technology in general. Technophobics are not likely to alter behaviour between rejection and early adoption. The lack of technophobics in this research must presumably be attributed to the overall engineering identity of the sample. All participants are in the business of 'inventing technologies', they are educated in an engineering profession and thus, they are likely to be positively to neutrally relate to technology in general. This would be in accordance to social psychologies understanding, that individuals seek the environment that allows them to express their identities (Smith-Lovin 2003, p.167).

10.3 Discussion of central role- vs. group-identities

The results of the study acknowledge that society exerts influence on behaviour through various social identities. The influence becomes apparent in group- and role-identities that influence individual behaviour through normative and structural bias. Distinguishing between a central group-identity vs. a central role-identity help to determine behaviour being predominantly individualistic or conforming; this is illustrated in Figure 45.

Thus, central social identities offer a new perspective for technology acceptance theories, and valuable possibilities for practice. An even greater understanding emerged, when the degree of importance of the respective identity and the content of an identity were further examined, which will be discussed in a later section.

Participants, who saw themselves primarily as a member of a group at work, acted in accordance to their internalised group values and conformed in the working context. Motivations were manifold and could not be simplified to the point that they exercised conforming behaviour in order to remain a member. Various social and individual forces interacted and subsumed in feelings of belonging, predictability or meeting expectations.

In contrast, participants who held a central role-identity of 'being different' from the rest at work, behaved more individualistic in their reaction to new technology. These central role-identities usually came with an efficacy-based self-concept of being more capable or less capable of something in comparison to those around.

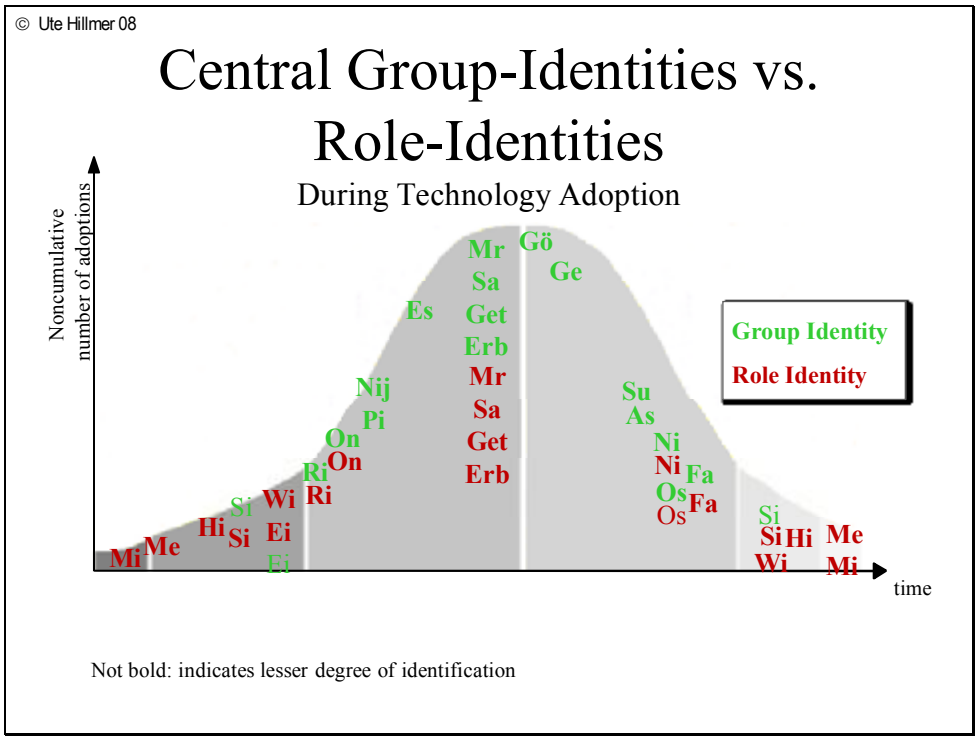

Figure 45: Central group-identities vs. role-identities

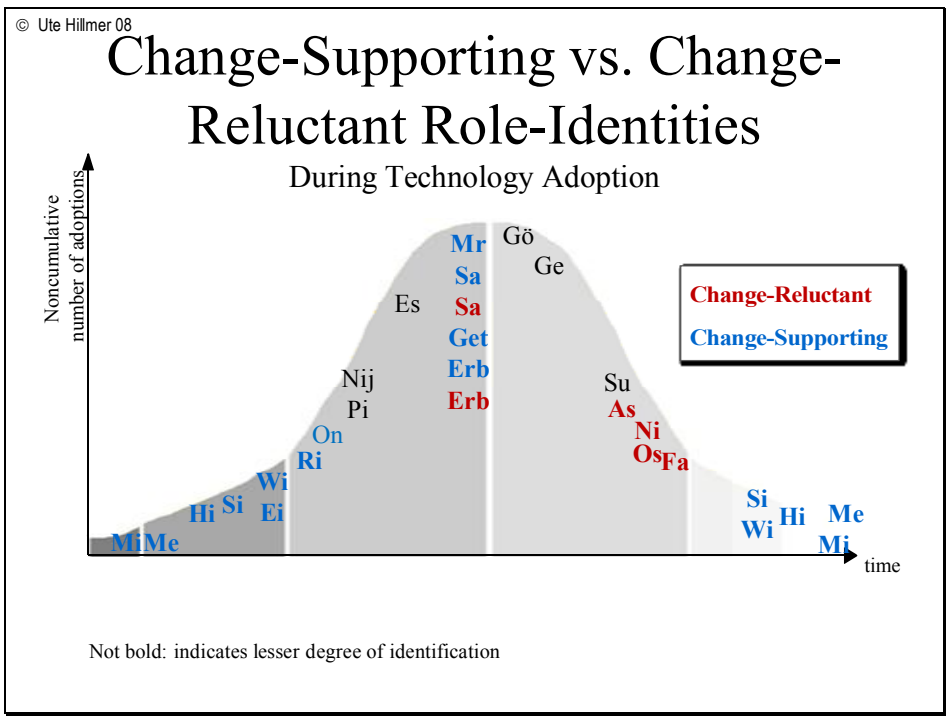

Figure 46: Change-supporting vs. change-reluctant role-identities

This supports other research findings (Stets and Burke 2003, p.132) that describe a direct link between efficacy-based self-esteem and role-identity, which has been described in the individual perspective. In the situation of technological change, this translated into change supporting vs. change reluctant role-identities. Figure 46 visualises them.

All change reluctant role-identity holders had parallel group-identities. Thus, it cannot be determined whether the late but conforming behaviour resulted from their conformance supporting group-identity, from their change reluctant role-identity or from a mixture of both.

The change-supporting role-identities self-divide into two groups: Those who hold group-identities in parallel, and those who hold no group-identity at work. For individuals who hold both, a central group and role-identity with conflicting content for technology adoption, the identities seem to moderate each other. An individually unique hierarchy of identities emerged, dependent on the centrality of parallel identities.

All individuals who hold one or more role-identities without a parallel group-identity engaged in individualistic behaviour. Their motivation was not influenced by any group goal, and technology was purely an instrument towards a larger, individually important goal. This explains why these participants were willing to invest a lot of energy and willpower by adopting early and actively pushing a technology, and it explains the motivation to reject a technology. A new technology can serve or endanger goals, thus they choose to reject those technologies that do not qualify to support their needs and goals. A fair insight into the particular situation is required, as well as a high sensitivity for the individual and an understanding of the opportunities and threads inherent in a technology in order to make sense of the situation, as seen by these individuals.

The parallel activation of central change supporting and change reluctant identities neutralised each other and participants behaved within the conforming adoption spectrum, which confirms Stets and Burke's (2003, p.24) vector analogy of identities, discussed in the identity section. It was not quite clear if the choice of individuals that adopted at average was a conforming act or an individualistic choice. This issue will be discussed further in this chapter under the title of 'influence on the situation'.

According to data from five individuals at the turning point between individualistic and conforming behaviour and vs., the hierarchy of identities can change. This change progresses over multiple years, which confirms the cognitive-emotional personality theory (Mischel and Shoda 1995), introduced in the individual perspective.

Furthermore, strong non-work related group- and role-identities at work mediate work related role-identities and make an individual more relaxed about possible work related identity conflicts. This is in line with self-complexity studies (Smith-

Lovin 2003 2007), and in contrast to theories of the decentred, fragmented post-modern self (Welsch 1987, p.194, Keupp 1997, p.17); theories that have been introduced in the merged perspective. In the researched spectrum of mechatronics machine design engineers and technicians, multiple identities construct more complex selves that can better cope with situational stress.

Friendship ties within a group-identity constellation were more influential than any other forms of ties; a substantiation of network theories claim that the stronger the ties, the more influential is the respective group-identity (Keeton 1999; cited in Smith-Lovin 2007, p. 116).

10.3.1 Emerging theory concerning role- vs. group-identities and individualistic vs. conforming behaviour

A theory emerged which states that one or more active group-identities encourage conforming behaviour, while a central role-identity encourages individualistic behaviour. The parallel activation of both central group and role identities functions as "vector additions" (Stets and Burke 2003, p.24). These findings can be explained by the network interaction of group- and role-identities: The network tie is the connection to a group of others (Smith-Lovin 2007, p.110). Thus in groups, it is foremost the relatively fixed social structure that forms the content for identity. In contrast, role-identities' meanings are focused on agency (Stets and Burke 2003, pp.132-3)*;* they are a network relation with others that defines a position in a social structure (Smith-Lovin 2007, p.110). This makes a role-identity a dynamic construct, defined primarily through rights and responsibilities as well as behavioural expectations.

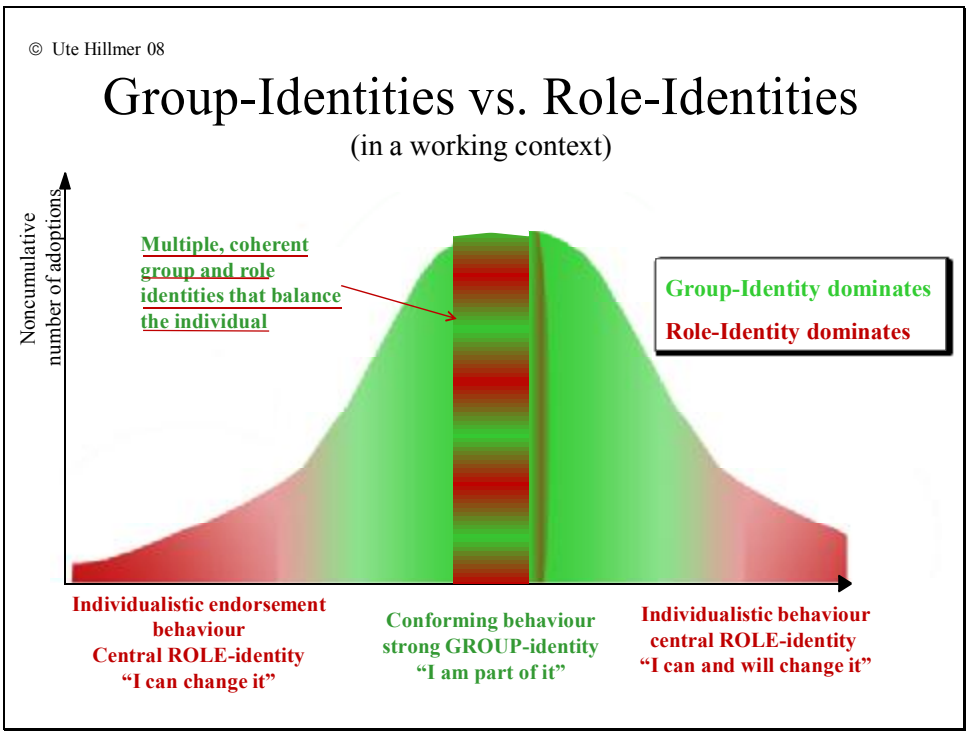

Figure 47: Schema of group-identities vs. role-identities

The correlation between technology adoption behaviour and predominant group- vs. role-identity is graphically converted in Figure 47. The findings confirm the appropriateness to use latest findings of symbolic interactionism based identity theory for a new and alternative perspective about the hidden relationships in technology acceptance behaviour.

10.4 Discussion of self-concepts of influence on the situation

A correlation between technology acceptance behaviour and individual's various forms of influences on the situation emerged. Changing oneself in the form of learning is one form of influence, changing the external situation is the other form that emerged.

10.4.1 Curiosity and ability to learn

A curiosity for something new and a willingness to learn and understand emerged for all individuals who adopted earlier or similar to the mean of the adoption curve. The strength of this curiosity stood out for those participants who engaged in individual behaviour. A few selected participants in the early mainstream emerged as equivalently curious but they had parallel, central group- and/or role-identities that attenuated the curiosity. Participants described this curiosity as a drive of unknown origin that is there or not there, and that cannot just be turned off.

10.4.2 Influence on external situation

Data emerged that indicates the importance of a participant's perceived influence on the situation other than their own learning. Participants with a dominant self-concept of "I can change the situation" were found either to take it upon themselves to influence the situation towards what they perceive as beneficial (which lead to individualistic behaviour) or they did not care to influence the situation, adopted at average, and can be found at the mean of the curve.

The difference between the behaviour of the two groups lies in the already discussed willingness to invest time and energy into turning the situation towards their edge. For individuals who engage in the second category of behaviour, energy was not wasted on something they perceive as less important.

10.4.3 A discrepancy between self-concept and situation

A discrepancy between a self-concept of "I can change the situation" and the actual influence on the situation resulted in high emotional stress, and individuals developed various means to protect their self-concept and their self-esteem. Along the same line is the perception that one should have been involved in the decision. The detailed dependence between the variables 'being involved in the decision', 'a self-concept of being able to change a situation' and 'technology adoption behaviour' is complex and cannot be revealed in this research. However, two individuals had the perception they can change the situation but cannot. Of the two, one was involved in the decision, the other was not and they both did not get their

way. Both reacted similarly, and were heavily emotional and self-protective. Consequently, it is likely that in this category, decisiveness rather than involvement influenced behaviour.

10.5 Discussion of identity content

It became apparent that a participant's composition of identities activated in the working context can be used to guide understanding about its interpretation of the technology changes' threads and opportunities.

Insight into the identity content allowed further understanding as to whether or not conforming adoption will be rather fast or slow, or if individualistic behaviour is endorsed or rejected. The identity content unveils by description of what makes individuals feel in balance or out of balance, what causes stress, anxiety and what does not. If one compares these stabilising and destabilising factors with the change potential inherent in a new technology, one is able to reveal the meaning understood by the individual. Guided by these stabilising and destabilising factors, a typology of identity content emerged, that is surprisingly closely related to Schein's (1996) career anchors, however, some significant differences developed. The emergent categories of work-identities and their difference to Schein's career anchors will be discussed in detail in the following paragraphs.

10.5.1 Identity rooted in technical competence

Most commonly found among the design engineers and technicians of this research was the central identification with technical competence. Almost all participants derived a sense of self-integrity by being technically competent and by exercising this competence. One can refer to this identity as a 'typical' professional identity of design engineers. The common motivational pattern found for participants who share this identity was the perception that new technology can enhance technical competence, and can increase the problem solving capacity and individual marketability. This stabilises and increases status and position. However, this opportunity comes at the cost of temporarily challenging one's technical competence, and maybe one's position in the team. Furthermore, increasing one's competence through new technology takes time to master the new technology in the short term, and design quality is sacrificed. In short, new technology offers an opportunity for increased competence, but at the same time, it threatens this competence.

10.5.2 Identity rooted in managerial competence

An identity of managerial competence was found to be very similar to technological competence. This professional identity develops for those designers who enjoy a more senior, coordinative and responsible function. The difference in the technology counterpart is that managerial competence identities were less tightly related to technology and thus, the threads of new technological changes were related to having made the right choices in a selection process, or getting the

new technology well integrated into the work process. As with technical competence, there are opportunities and threats that reside in a new technology.

10.5.3 Identity rooted in technical or managerial challenge

Individuals who accepted a new technology early were unified by the need, maybe better described as 'their drive', to meet new, extraordinary challenges. Schein (1996) has described these individuals; however, the grounded data of this research suggests a split in Schein's original "challenge" category into technical and managerial challenge, since they emerged as distinctly different and not overlapping.

Individuals with an identity of technological challenge should be further split into two significantly different groups that have a clear impact on technology behaviour: Some treat new technology as a means of getting ahead of others; consequently, they were willing to adopt a new technology at an early stage. They also used technology as an instrument to test proficiency, power and influence, which explained their open rejection in some cases. This type is categorized as a 'technical competitive challenge' identity. In contrast, other technical challenge identities were driven to discover and to better understand new technology, independent of its recognition, a 'technical knowledge challenge' identity. This group emerged as much more laid-back and stress-resistant, because their self-concept did not relate to the 'success' and 'failure' of the undertaking, and their perceived status and prestige was not dependent on an 'efficient and fast mastering of the technology'. Their value system was significantly different.

The need for managerial challenge seems very similar to the technological, competitive challenge identity described above. Other than their technical counterparts, they valued wide networks that they turned to for advice. Having and maintaining such a network stabilised these participants; they claimed to be excellent keepers of wide and strong networks. More details can be found in the discussion of information society's new values, which indicates that such wide networks are the information sources of the future. Consequently, managerial challenge identities increasingly hold valued positions in the stratification hierarchy of 21st century's society, a development they are well aware of, and they actively maintain in order to increase status and prestige. Given this information, the effort to master the latest information and communication becomes even more worthwhile and rewarding for them.

Reducing the perception of technological change to new technical benefits, functionality and the threads of new learning are far too narrow to grasp the meaning, that competitive challenge identities, attributed to technological change. This group's motivation affirmed their self-concept at work. In all cases, technology was used as an instrument to achieve a larger goal.

10.5.4 Identity rooted in security and stability

Almost 30% of all participating designers had a central identity that sought stability and security. They all sought routine, habit and clear guidelines, through a variety of means such as organisational hierarchy, cohesive ties at work, workflow processes, or financial security through job security. This stability is jeopardized by new, disruptive technologies, because these technologies change work processes, communication structures, and they threaten existing hierarchies and positions. All of these participants held a parallel identity of technical competence as a means to ensure their stable position in the structure. Thus, new technology destroyed routines and formal structures, threatened existing technical competence, and effected short-term design quality. All of these factors destabilized and clearly outbalanced the opportunity for additional competence. This identity type 'suffered' the most, at least in the short term, from technological change and thus, they were reluctant to adopt new technology. All participants with a safety identity held one or more parallel group-identities, and they all adopted technology within the conforming spectrum.

Various narratives offered explanations as to why particular participants became security seekers. They demonstrated the influence of experience on self-concepts and meaning systems. However, these experiences were of a complex, non-linear influence on participants' meaning systems. One example was Ni, and his need for hierarchy, which he directly associated with his upbringing in communist Poland. This experience must be contrasted to Sa, who was brought up in communist east Germany, but he found no comfort in hierarchies at all. While both individuals experienced strong hierarchies and a dominant, inflexible power structure during their youth, additionally, not directly associated experiences led to very different associations in the two participants' meaning systems.

Furthermore, a correlation between the identity of stability/security and age emerged. All participants beyond the age of 55 held a stability/security identity that has grown over the years. This verifies a shift in career anchors through the influence of age (see also Marshall and Bonner 2003, p.285). While the negative correlation between learning something completely new and age is not new (Spitzer 2002, p.280), this research reveals new aspects of the phenomena that will be discussed in a separate section in this chapter.

10.5.5 Multi-identity of work-life balance

Individuals who were proud of their variety of different non work-related identities were positioned in the conforming spectrum of the adoption curve. Participants who possessed a very balanced approach towards life and work were positioned either early or at the mean point of technology adoption. They had multiple, coexisting identities that only marginally conflicted. These 'multi-identity'-selves had a balanced self-concept which did not make destabilising experiences go away, rather, it gave them multiple perspectives to look at the situation, causing what Smith-Lovin (2003) explains as "mixed experiences" (p. 175) of stabilising and

destabilising factors rather than pure destabilisation. Participants with central, non-work related group- and role-identities were more relaxed about possible work related identity conflicts. Self-complexity studies (Smith-Lovin 2003, 2007; Thoits 2003) verify these finding, while it is in opposition to theories of the decentred, fragmented self (Welsch 1987, p.194, Keupp 1997, p.17). This research that is based in the mechatronics machine design, has shown that the complex construct of respondents' multi-identity selves can protect them from situational stress.

These 'multi-identity' can be contrasted to all participants with only one central identity active at work. All of these 'single-identity-selves' happened to be work-centred role-identities, containing some form of positive self-efficacy. They adapted very early or not at all, but in both cases performing individualistic behaviour. Figure 48 illustrates the difference.

For participants with a strong need for a balanced life-style, new technology offered something new, fun and a variation to the routine work. However, they all agreed that the extra time and effort required to master new technology is not always available in the daily work environment, thus they did experience stress when managing the time requirement. However, they tend to not care and worry too much, they stay in the mainstream and take "one step at a time" (Mr).

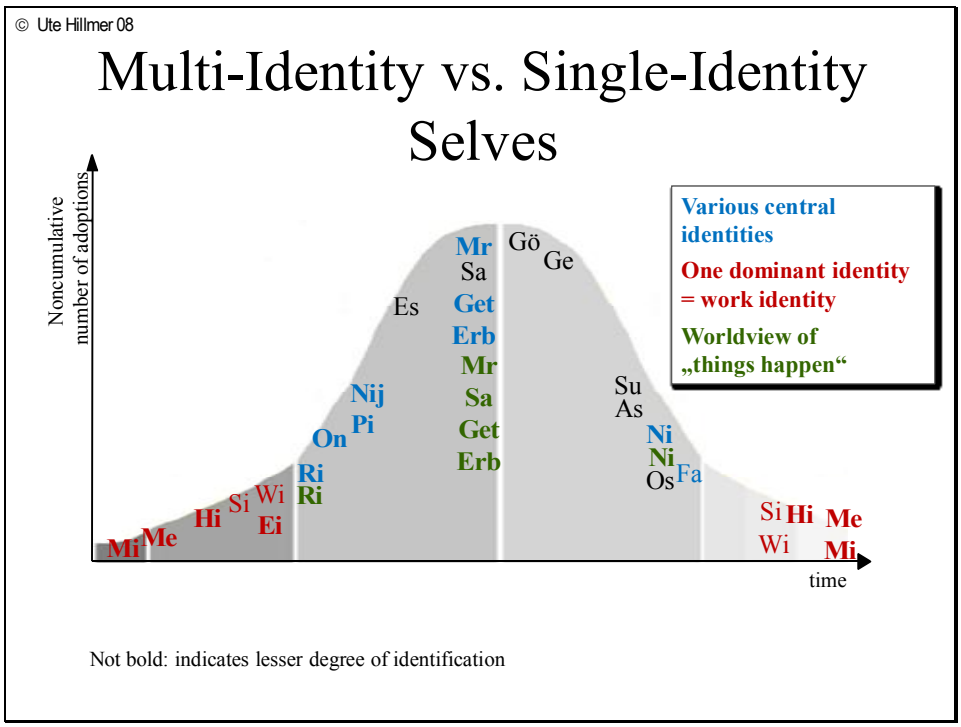

Figure 48: Multi-identity selves vs. single-identity selves at work

10.5.6 A typology of the identity content in mechatronics machine design

The previous sections demonstrated the importance of individuals' identity contents in a situation of technology acceptance. These individual contents reflect the individually different degree of societies influence on individuals' conducts, just as they show the individualistic forces through personal identity.

The investigated group of mechatronics machine designers usually held various role- and group identities along with their personal identity simultaneously. Typical constellations were an identity of technological competence along with a need for stability and security. This combination resulted in conforming technology acceptance with a tendency to late adoption. The few participants who had an identity of technological competence but no other, apparent identity usually adopted technology with the majority. Another combination found in multiple cases was the identity of technological competence together with an identity of work-life balance. These participants adopted new technology early to medium, in a conforming manner. An additional identity of technological knowledge challenge did not appear to overwrite that behaviour. Participants, where competence was dominated by technological or managerial competitive challenge adopted technology either very early or not at all.

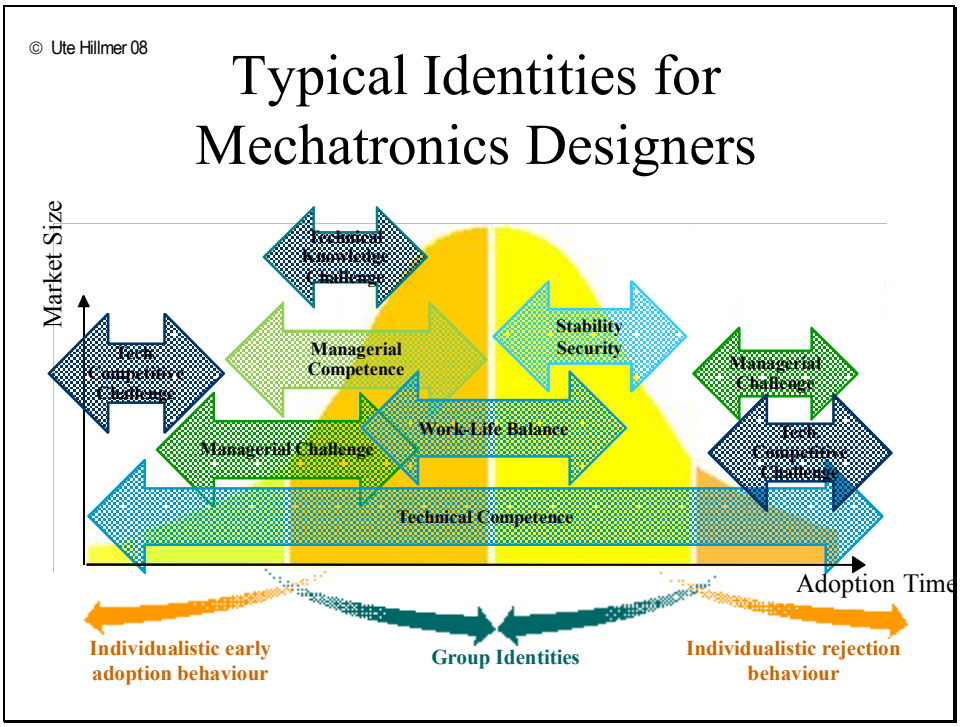

Figure 49: Typical identities for mechatronics designers

They engaged in individualistic behaviour and had a self-concept of influence and superior competence. It can be speculated that personal-identity, the more organic, pre-existing physical and psychical characteristics of an identity is responsible for the "drive" (Me) that these participants report. Furthermore, information societies value system rewards dynamic, innovation driven behaviour, which emerged as a further motivator for these participants behaviour. Figure 49 illustrates the emergent combinations of identities.

Higher importance of identities results in a higher emotional state, which includes enthusiasm or anxiety. The more emotional an individual's response is, the more

important was this identity (Stryker 1987), because there are self-integrity processes at work.

10.6 Age as a cause for identity conflicts

Older participants tend to be slower in accepting new and disruptive technologies. What has long been treated as common wisdom has been verified by neuroscience (Spitzer 2002, p.280) and this research confirms these findings. However, the meaning systems approach used in this research offers additional explanations and a deeper understanding. With increasing age, different identities are active in parallel, yet their content is not compatible, which causes identity conflicts and integrity problems. Figure 50 illustrates the age groups and their position in the adoption curve.

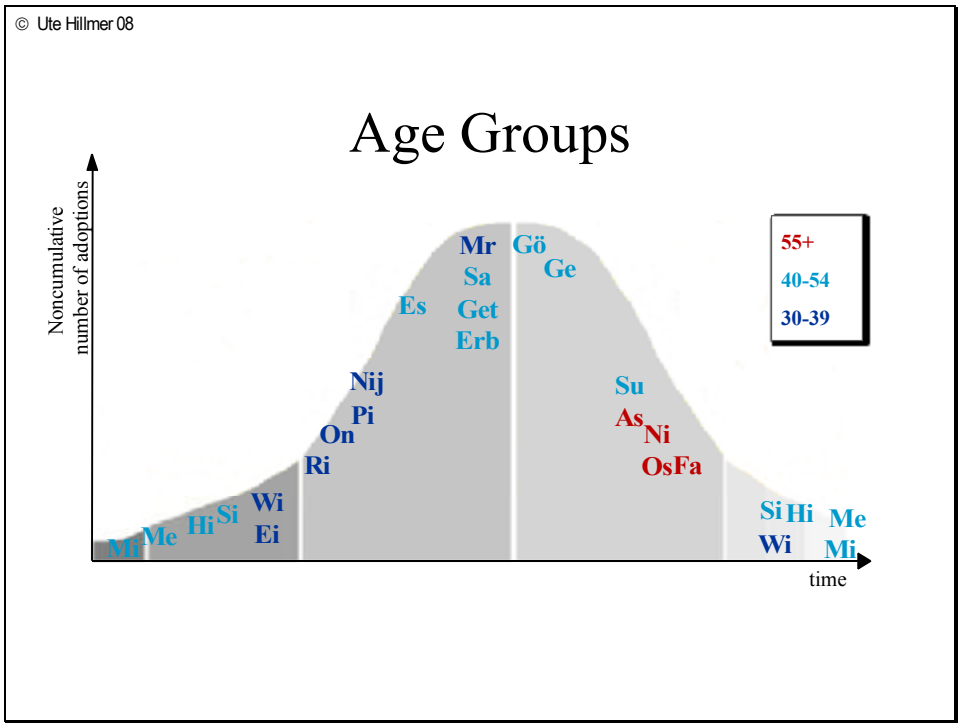

Figure 50: Age groups and technology adoption

All participants aged 55 and up mentioned significant discomfort with the impact of increasing age on their technological competence. It is the worry of not being able to keep up with technologies' pace. They all felt uncomfortable about technological change, but none fought management or team decisions. That they all conformed could be specific to the available cases, because no centrally role-based participant above the age of 55 was part of the sample. For now, only primarily conforming, group-identity based participants above 55 were considered.

Those participants have been engineers or technicians for over 30 years, and as most other participants in this research, they derived their sense of identity and integrity at work by using their technical skills. As this study has indicated, this comes along with a high identification with technology, pride in one's own

engineering work, and a joy of being challenged by technical problems. Liking and endorsing technology was an integral part of their job identity. However, being grounded in this identity requires constant updating of skills and knowledge especially in a profession that invents and designs new high-tech machines.

When these participants passed the 50s, they became increasingly aware of their age and slowly developed a role-identity as 'an older' or even 'the oldest guy in the team'. This emerging identity came with the perception and experience that learning something completely new is no longer easy; that one is slower to learn about new technology than the rest of the team because of the advancing age. Thus, reluctance and unease concerning new technology developed in this group of individuals. An identity conflict between a newly developing need for stability and routine vs. the highly valued technical competence developed. In other words, the new and growing role-identity of age stood in direct conflict with a self-concept of being a competent engineer or technician that guided their behaviour for decades. A disparity between identities developed that is experienced psychologically as the sense that the world is unpredictable, not right, or disturbing (Smith-Lovin 2003, p. 175), which makes the observed and articulated stress of this category of participants understandable.

These situations also provide evidence of the identity theory's understanding of emotions. For one, negative emotions result from not meeting one's identity expectations (Stets and Burke 2003, p.139), and when such negative emotions are felt, individuals either change what they are doing or they think of the situation in a different way in order to achieve congruency with their self-concept again (ibid. p.141). In this study, the participants could not change the aging factor, but they could change the way they make sense of the situation in order to maintain some self-esteem. Thus, the emerging data is understandable and explainable in the light of the various self-processes to maintain self-integrity (self-verification, cognitive dissonance, and self-discrepancy theory), that have been explained when identity processes were introduced in the individual section. Furthermore, Stryker (1987) pointed out, that the strength of an emotional response to identity-related behaviour signals how important an identity is in the salience hierarchy; more important identities produce stronger emotions (ibid. p. 140), which offers an explanation for the varying degree of anxiety and emotions that emerged among the individuals that considered themselves as 'older'.

Finally, one should consider the increasing societal value of knowledge in this century. As the societal perspective unfolded, information society's stratification hierarchy is increasingly influenced by theoretical knowledge and much less by practical experience. While practical experience used to be the measure of value for older employees, this no longer is true. Losing status and prestige because of a changing value system becomes particularly obvious through disruptive technological change and creates further stress.

Not all of the described behaviour can be explained by emotions and self-integrity processes only. Participants with many years of experience in machine design reported that they developed their personal ways of looking at a design problem, and they have developed personal processes that work best to resolve them. One respondent called it his "personal thought patterns" (Fa) to resolve engineering problems. They fit the individual's work and thinking style and they have been trained to become highly efficient over the years. These individually proven processes differ between participants. New disruptive technologies usually destroy such individualistic processes, because technologies commonly unify larger portions of the workflow. Consequently, participants with many years of work experience not only have to learn a new technology, they also have to "un-learn" their internalised processes. When adopting new technology, they trade what they perceive as highly efficient, for something they do not yet know, and where they expect to be slower at learning than younger colleagues.

10.7 Discussion of mechatronics disciplines

Different engineering disciplines have different educational and experiential backgrounds, which could influence technology acceptance behaviour. However, no correlation between technology adoption behaviour and different engineering disciplines emerged. A more detailed investigation of preferred data formats and working styles, which usually change with new technology, also revealed no significant relationship between engineering discipline and technology adoption.

Almost all participants reported to have worked or have been educated in at least one additional engineering discipline besides their core discipline. This thwarts a direct and specific disciplinary allocation of individuals. Future research with undisputed disciplinary allocation and a higher sample size will be better suited to reveal a possible relationship between mechatronics disciplines and technology acceptance behaviour.

10.7.1 Technology enabled work-process changes

Mechatronics related data emerged that might further increase understanding for technology acceptance behaviour particular in this industry and profession. Mechanical engineers (ME) have traditionally been the core design discipline in machine construction in Germany. With the increasing importance of electronics and sensoric technology, this hierarchy has started to shift, while organisational structures and informal hierarchies still display the traditional structure. The overall project responsibility for design and time traditionally resided in the mechanical domain. In six of the seven researched organisations, mechanically educated engineers headed the design departments. However, new market demands increase the share of electronics in machine design and new mechatronics design technology slowly changes this hierarchy of disciplines by enabling and enforcing time saving parallel design work of all disciplines. Mechanical engineers and technicians were

aware of these changes, as are some electronics engineers. The consequences are outlined by discipline in the next sections.

10.7.1.1 Mechanical engineering (ME)

New mechantronics design technology and the revised processes have consequences for mechanical engineers. These engineers are at risk to lose the project, design and time sovereignty in high-tech machine design that they traditionally owned. At the same time, they are requested to coordinate and thus understand the engineering disciplines in detail, since new technologies demand integrated, holistic understanding. Consequently, they are at the forefront of practicing mechatronics; mechanical engineers can gain most from mechatronics developments while at the same time they are at risk to lose most, too, if they fail to adjust. The mechanical engineer in high-tech machine design is offered the opportunity and the challenge to change towards an engineering generalist.

From all of the engineering disciplines, the interviewed mechanical engineers reflected the highest degree of identification with the overall project, its business indications as well as overall company and customer benefits.

10.7.1.2 Electrical and electronics engineering (EE)

Electrical and electronics engineering, along with automation and control technology, has traditionally been the "underdog" in Germany's machine design. They claimed to be involved late, when the most important design parts were frozen. Thus, the frustration of not being able to contribute creatively towards a better machine design has emerged from the data. Even more often, electrical and electronics designers complained that projects were already on a critical path, when they were handed into their department, which constantly added extra stress to their work schedule.

Among the participants researched in this study, EE engineers were very process oriented and highly embedded in the existing workflow, which can be related to their professions flow-chart dominated problem solving tradition. For EE engineers, new mechatronics design technology has different consequences: They become involved in projects earlier, and thus can actively influence machine design more often. Additionally, new machines contain increasingly more electronics and control components, augmenting the importance of their designers' contribution to overall design. Electrical engineers were the group most inflexible to accommodate workflow changes, however, once the new workflow was established, electrical engineers gained stability fast.

10.7.1.3 Software engineering

Software engineers differed most significantly from other engineering professions. In mechatronics product design, two categories of software engineers are differentiated. There are those who design the software necessary to automate and control the machine, and those who work on more sophisticated software components in higher programming languages, which usually involve the entire

product structure. While the first category merged with electrical and automation engineering functions in the cases investigated, the latter category developed components that are integrated into product lifecycle management (PLM) and enterprise resource planning (ERP). The level of complexity and abstraction of these software components is significantly higher, and these designers viewed themselves as different from the other engineering disciplines. Some of the most distinct differences that software developers pointed out were: "a piece of software is never really finished, so one should never aim to use "being done" as a measure" (Sa); It also was pointed out that one cannot study to become a software developer, because it is a hobby that turned into a job (Sa). Software engineers 'play' with solutions, rather than engaging in long upfront planning. It is a trial and error game, which one developer described as "doing, not thinking" (Pi)[9]. The work of these software designers became significantly more structured through new technology, offering modular design approaches that "take away creativity, but that allows a new level of depth" (Sa). Software developers seemed especially aware of technologies fast development and that "getting older", is destroying competence. One software designer in the early thirties wondered for how long he would be able to follow the increasing level of abstraction necessary for good software design.

10.8 Limitations and potential areas for future research

This study adopted a new perspective to understand technology acceptance behaviour. To understand the problem differently, a multi-disciplinary literature review was developed using frame analysis. In order to find out if this perspective is helpful and which aspects work and which do not, the investigation was very broad and multi-disciplinary, which limits its overall depth but no more than other work of its kind. In the final analysis, this work has provided a new, user-focused perspective in technology acceptance. Additionally, the qualitative case study approach produced specific conclusions that may be useful in other contexts.

10.8.1 Limitations of the research design

The frame analysis used a single case study to navigate through a broad spectrum of existing theoretical knowledge. Bryman (1988, p.90; cited in Saunders 1003, pp.260-1) argues that within one case study, a wide range of different individuals and activities are invariably examined, and the contrast with survey samples is not as acute as it appears at first glance.

The field research for this study was conducted in seven German mechatronics machinery organisations with twenty-two machine designers, and it can be argued that the sample is small and unrepresentative. However, the findings do not have to be limited to these cases. They do relate to latest identity theory's positions, which

[9] There are various structured and unstructured ways to go about software development. One perspective is expressed here.

according to Bryman (1988; ibid), and Yin (1994; ibid.) supports generalisability of qualitative research and verifies the applicability of methods of social psychology to the research problem. Furthermore, in technology acceptance behaviour, the causal linkages are complex and cannot be clearly determined in this research.

The researcher works with self-reported data from participants who were roughly categorised and pre-selected by their management in order to offer a spectrum of technology acceptance behaviour. The researcher ensured confidentiality and trust was initiated between the parties, but there was no guarantee that this occurred. It is ultimately up to the participants to volunteer data, to report truthfully, and it is not possible to control bias in all cases. Furthermore, there may be a misinterpretation of responses. Overall, in-depth interviews offer the opportunity to establish trust, and to explore meanings and intents; thus, they allow a summary of understanding by the interviewer. Never the less, the researcher was not able to understand one of the twenty-two participants (Get).

10.8.2 Unsatisfying research approaches

10.8.2.1 Company culture, group-identity and technology acceptance behaviour

The study was designed to distinguish between different organisational cultures regarding technology acceptance behaviour. However, this research unveiled that different participants perceived the same organisation or work-team very differently, which affirms a meaning system approach. Furthermore, the perceived culture did not emerge in any correlation to individual's technology acceptance behaviour. Quan-Haase et al. (2007) indicate evidence that in the perception of most individuals, the organisation remains a hierarchy, independent from its organisational structure, which might explain these results.

Some research indicated a negative correlation between the downsizing experience and participants' degree of identification with their company (Marshall and Bonner 2003). This research does not confirm this finding; but supports the opposite, which might be specific to the industry segment or to the national culture. All participants who were on the job for more than 10 years have observed or experienced significant restructuring and downsizing efforts within their company and departments, yet their company loyalty and identification within the organisational structure remained strong.

10.8.2.2 Preferred working styles and data structures

The attempt to investigate preferred working styles, data formats and their relation to technology and technology adoption did not reveal any pattern. In order to yield better results, a much more focused research approach might promises more success. This research design was targeted at understanding individuals' meaning systems through a loosely knit web of questions that probed the individual thoughts, but did not produce the extraneous understandings of preferred data formats.

10.8.2.3 Twenty statements test

Kuhn and McPartland's "Twenty Statements Test" was utilized and analysed in two directions. The number of answers related to a working context in comparison with other contexts (e.g. family) was intended to reflect an individual's embeddedness at work. The specific individual patterns were compared to other available identity and embeddedness data and to technology acceptance behaviour. The responses did not correlate with any of the other research findings. This can be attributed to a mistake in research logistics: While all other information was contributed in a working environment, which is said to activate the 'relevant work identities', the twenty statements test was often filled out in a private setting at home. According to identity theory, this different environment activates different identities that are not necessarily in any relationship to the research.

10.8.2.4 'If…then…' self encoding

Furthermore, the 'if … then' self-encoding approach to conceptualise personal structures did not yield useful data in this research design. The three questions in the format of "if … then I would reject a new technology for product design completely" did not fit the otherwise conversational flow of the investigation, and consequently, both the researcher and most respondents felt uncomfortable. The data that emerged seemed completely out of context in the sense that it was unrelated to the immediate working context and rather hypothetical. An example is the answer "if it were military arms of offence technology, then I would reject… " from a respondent who actually rejected a new design technology within his working context without any military relation. However, the generic answer 'I would reject' requires a conscious motivation, which is most likely not present in the typical rejection process at work. Consequently, 'if … then…' questions were removed from the semi-structured interview guide after ten interviews.

10.8.3 Recommendations for future research

This study is considered action research, and it was based on the premise of understanding the domains involved in order to successfully investigate technology acceptance holistically. It was not clear in the beginning, which direction the study would take, and which areas of existing knowledge would contribute. This study has been an important first step toward uncovering relevant additional perspectives to further understand technology acceptance behaviour. Further, detailed research is necessary in order to understand the in-depth, causal relationship between social identities and personal identity and their influence on technology acceptance behaviour. This might be achieved through the detailed investigation of specific acceptance behaviour and its relationship to identities, by the investigation of 'multi-identity selves' vs. 'single-identity selves', or by investigations in and across industries and professions. All of these future research areas can contribute to a broader theory of technology acceptance behaviour. While this methodological approach is likely to produce different results in different industry segments and

with different professions, the applied methodology is not industry specific and might be therefore of general interest.

10.8.4 Validity vs. inherent bias in this research

From a position of symbolic interactionism, no objective truth and meaning is possible; there is always some interest encoded and a particular world-view applied in any research design. According to Johnson and Duberley (2000, p.170), the adjudication of the truthfulness of any knowledge-claim can only occur when there is a clear reference to the interest that started the investigation or the statement in the first place. In other words, in order to ensure validity, the researcher's interests and world-views must be openly stated, which has been discussed at the outset. Being aware of possible bias, preparing the research details precisely, and being reflexively aware of one's own bias were precautions taken in this research.

The "pro-innovation bias", which dominates the thinking of the western business world, must also be considered when discussing bias inherent in this study. The "pro-innovation-bias" reflects that new technology is generally viewed as progress, which is something organisations usually want, and consequently, innovativeness is laden with positive value (Rogers 1995, p.104). This bias is present in this study, however to diminish this bias, the behaviour was documented and discussed value-free. Throughout the research, participants behaviour, rather than personal characteristics are discussed. The pro-innovation bias is relevant, because history reveals cases where the assessment that innovation equals progress is wrong: many drug related innovations were highly consequential in a negative way; nuclear power has revealed many negative sides; thus, it is questionable if recent innovations ought to be seen in a positive light only. Maybe the real heroes of technological changes are those that resist technology. The pro-innovation bias is a cultural bias and cannot be disowned in this study.

10.9 Implications relating to theory

This research study explored a meaning system approach to technology acceptance behaviour. The influence of an individual's subjective meaning in a situation of technological change was researched. Furthermore, social and individual sources that wield influence on this subjective meaning primarily using identity theory and network theory were researched. Contradicting and thus conflicting situations were brought to light by neural network models, self-integrity theory and mechanisms to protect the self-concept.

This alternative approach revealed meaningful, new insight into technology acceptance behaviour, and this contributes to the spectrum of existing knowledge on technology adoption by closing a gap between social structures, an individual's meaning and self-concept, and influence on behaviour; aspects that have not been investigated to date.

10.9.1 Contribution to technology acceptance and adoption theory

This research study focused on meaning, as individuals attach it to technological change. In so doing, the study focused on the immediate and past context, and on social and individual influences that might be scarcely perceptible. None of the existing technology acceptance models takes into account such elements. However, these elements are considered highly influential when evaluating individuals' behaviour from a perspective of symbolic interactionism. Existing models of technology acceptance and adoption can benefit from additional studies of individuals' meaning systems, as suggested in this research study. Rogers' theory of technology diffusion, in particular his technology adoption model, assumes a personality difference among the various different adopter types, but it does not go further. This study contributes to this theory by offering further levels of details in understanding and a methodology to go about it. The focus in this study was on twenty-two cases in mechatronics machine design. Future research within different industry sectors and professional groups may be necessary to broaden the spectrum.

Contribution to management science

This research study used grounded theory to study a business problem, which is not common practice. The results encourage the use of this theory, which promises the consideration of a more realistic spectrum of influences towards behaviour at work. The particular findings of this research study qualify aspects of an individual's meaning system as important, the role of self-integrity in a situation of technological change as highly influential, and the suggested identity typology for mechatronics design professionals as a guiding structure. All three aspects have implications for theory in change management, technology development, technology diffusion theory, technology marketing as well as technology sales. Each one of these knowledge domains is enhanced by sharpening consciousness and understanding for technology users' spectrum of identities and the derivable factors that influence self-integrity. The grounded theory approach has shown that social psychology literature has a part to play in a deeper understanding thus provides business science with an additional valid and alternative way of investigating business problems.

Contribution to organisational psychology

This research study also contributes to organisational psychology by confirming Schein's (2006) career anchor theory, described in the organisational perspective of the frame analysis. This research identifies different and more specific anchors found in the mechatronics niche, which might offer an explanation as to the ongoing dispute between the appropriateness and inappropriateness of his selected anchors. They may be specific to the industries or professions investigated. Furthermore, this research validates that career anchors change (Bonner 1997; cited in Yarnall; Feldman and Bolino 1996; Igbara et al., 1999), and that more than one career anchor can be active at one time (Feldman and Bolino 1996).

Contribution to social psychology

The research study results verify symbolic interactionistm based identity theory. This study applied typical methods, attaining identity theory, and the area of multi-identity and its effects of intensification or collision of values, beliefs etc. emerged as particularly interesting for technology adoption behaviour. Furthermore, the research reveals some limitations in Dweck's (2000) theory on learning styles. Dweck's theory served as a guide for further insight into learning styles, however, her clear cut two categories of learners, a master learner vs. a helpless learner are derived from students and did emerge as too limited in the business world of mechatronics machine design. More context specific mixtures of the two categories were found that reflected the various identities and interests that participants held in parallel.

10.10 Implications relating to practise

This research study also has implications for the practice of technology development, technology diffusion, technological change management as well as technology sales and marketing.

Unpredictable and confusing technology acceptance behaviour is stressful for all involved parties. Users experience stress and anxiety whenever technology is perceived as a threat to their self-concept and -integrity, and those strong feelings and emotions can get in the way of good work. Since organisations only attain an anticipated effect, if users make full use of technology, it is in both sides best interest to reduce anxiety and increase understanding. Along the same line of reasoning, technology vendors invest time, money and effort in new technology development, yet their technology inventions dye early, if they do not diffuse.

This research study further suggests that technology acceptance behaviour can be grasped and assessed prior to technology adoption, when one sharpens one's attention and develops sensitivity to an individual's embedment in the organisational structure and to its active identities. When aiming to implement a new technology successfully, one must gain an understanding of the individuals and their degree of embeddedness in the organisation. This may help to determine if a particular individual should be confronted with new technology in an initial kick-off phase, where the technology adoption is an individualistic act, or rather later with the majority of the work-team. Role-identity centric individuals that hold no group identity are willing to 'stick-it-out' by making an early move towards a new technology, if one is able to make the new technology contribute to these individual's personal goals. However, these goals are highly individual, often well hidden and not easily revealed, yet once they are understood, technology vendors can enter the market at an early stage and pilot projects can be implemented successfully. In contrast, individuals who are well embedded in a group, meaning they hold one or more central, work related group-identities will conform to the

overall decision but will aim to move with the majority of the team, which makes them unsuitable for the kick-off phase of a new technology.

When the goal is to develop a successful, broadly applicable new technology, or technological process, the conforming group-identity centric user is an important source of information. Their work-centric common identity combinations offers valuable guidance to 'must-have' features of the technology, and to add-ons that will increase the comfort level of adoption and usage for this majority group.

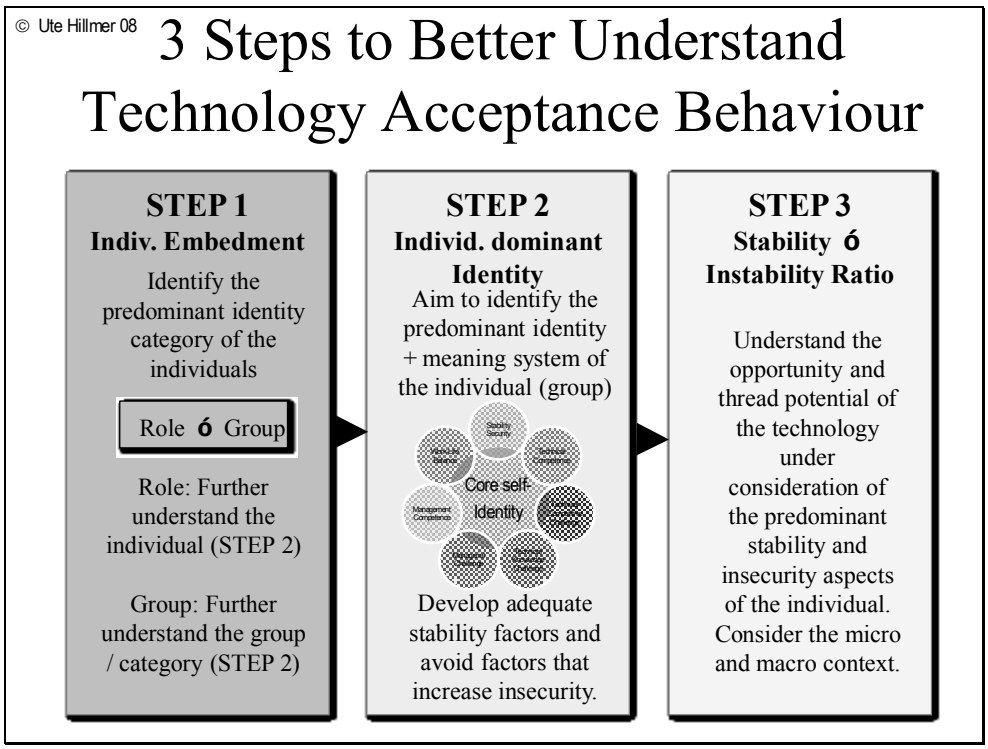

Figure 51: Three steps to better understand technology acceptance behaviour

Overall, being sensitive to the various parallel identities of group-related individuals is crucial for development teams that define the core features of a new technology. There is some value for the project manager in charge of implementing a new technology, in order to identify the appropriate users for the various phases of a technology roll-out. Understanding and addressing the particular needs of the various identities, for machine designers, especially those with an stability and security identities is likely to ensure a smooth and anxiety free roll-out. Finally, this conforming group is the target user group for any marketing and sales activity beyond one-to-one marketing and sales, which is applicable once a technology has been introduced into a market.

However, in order to initially kickoff a new disruptive technology, this conforming group is not critical. For a technology vendor to launch a new technology into a market, for a change manager to get a change project started, role-identity centric individuals must be understood in their overall drive to compete and in their individually different personal goals. Since the goals vary, sales and marketing

activities have to be highly individualistic, which is reflected in some technology marketing strategies such as one-to-one marketing (Pepper 1993). Figure 51 illustrates the overall logic of this new process of understanding.

This research study also may indicate that the assessment of an individuals' interpretation of technological change is situation and context specific and cannot be generalised. However, a typology of identity types for mechatronics machine designers emerged that is summarised in Table 10. Such a typology aids a fast assessment of identity types and their meaning. It is highly feasible that within other industries and professions, other typologies are found. Finally, if technology vendors understand the identity topology of the mechatronics machine designer, they can design products that cater of the most relevant aspects of these identities, making technology adoption more likely in the first place.

Next page: Table 9: Typology of identity types for mechatronics machine designers

Table 9	Technical Competence Identity	Managerial Competence Identity	Security/ Stability Identity	Technical /Managerial Competitive Challenge Identity	Technical Knowledge Challenge Identity	Work-Life Balance Identity
Self-concept Driving moti-vation	*I am technical competent.* *I can learn what I don't know.* Liking of technology and its functions; doing a good job for the company; some: specialised are of knowledge.	*I can manage this.* *I can learn what I don't know.* Rest similar to technical competence	*I have made it – and I secure it now.* Aim for employment security, work routine security, financial security and geographic security.	*I can do it, no matter how hard it is* A need to meet new, extraordinary challenges and successfully resolve it; feeling technical / managerial superiority to the rest of the team; pleasure of competing and winning.	*I want to explore this* Meeting a new technological challenge; further understanding technology; playing with technology and discovering if it is useful.	*Life is more than work* Multi-identity individuals; There is more that work to life. One must enjoy the way, not the goal, else life is over and one had to time to enjoy it.
Charac-teristics	High technical skills; high identification with technology, pride in one's engineering work and a joy of being technically challenged. A professional identity for machine designers.	Analytical, financial and interpersonal skills. Motivated to exist in a political environment. Emotional make-up to make highly consequential decisions with only partial information. A professional identity for senior, managerial machine designers.	Security factors would not be compromised; to 'function well' ensures tenure in a job.	Doing what nobody succeeded to do or tried before; competing and winning. Highly competitive; perfectionist; dynamic; innovative; impatient; more clever.	Discover something new, understanding something further; high curiosity.	Career as a part of a larger "life system", family and private concerns integrated into the career plans in order to achieve a valued life style. Tend to not care and worry too much; aim for going one step at a time; perceive the world as something that can only partially be influenced.
Stability factors	Competence and knowledge; a sense of being able to cope with work challenges; ability to learn; being respected for work; being efficient as well as willing and capable to work hard	Holding a network of experts; rest as technical competence identity	Save job; competence; to function well; be a loyal member of a valued group to receive loyalty back; doing 'good work for good money'; having a stable position within the working hierarchy or workflow; clear, stable structures; for some: cohesive ties at work.	Feeling respected by others; meet + master challenges, and be recognised for it. Doing something valuable, something "good for humankind; affirm self-concept to themselves and to the world. Mgmt: having and maintaining wide networks of expertise.	Learning something new; understanding something better; having time to enjoy a discovery job; having food for thought.	Various parallel identities give them multiple perspectives for a situation; not taking work too seriously, because there are other important things; being part of a larger system **è** relaxed attitude towards their influence in the world.
Desta-bilizing factors	Questioning technical competence and knowledge by them or by others; complexity of the technology that must be designed can be overwhelming **è** the feeling of lacking professional competence; not enough time to do a quality job	Questioning technical competence and knowledge by them or by others; Uncertainty and complexity of decisions **è** the feeling of lacking professional competence;	Questioning job security; questioning technical competence and knowledge by others **è** endangers tenure in a job; changing hierarchies and workflows;	Not gaining recognition for achievements; not being respected as superior; not being able to cope with a situation;	Not having enough time to 'enjoy' new discovery.	Having to compromise time between different valued groups; feeling of disloyalty towards others when there is no time for them.
Like about new techn.	Opportunity to enhancing technical competence; enhancing problem solving capacity; enhancing one's marketability; opportunity to enhance status + position.	Opportunity to enhance managerial competence; enhancing problem solving capacity; enhancing one's marketability; opportunity to enhance status + position.	Can further ensure job security; can make work easier and helps to do the job, once routine is established again.	Opportunity to get ahead with new technology; achieving personal career goals; new challenge and competition; gaining status; learn something new.	Something new to discover and 'play with'.	New technology offered something new to learn, fun and a variation to routine work.

11. Conclusions

The central aim of this research study is to develop a greater understanding of the relationship between social and/or personal influence and technology acceptance behaviour. The study attempted to increase understanding about the ways in which social and personal influences affect an individual's subjective interpretation of a situation of technological change in the working context. This was achieved by increasing an understanding of the subjective meaning, users attain in a situation of technological change.

The frame analysis used in part III discovered a multi- and cross-dimensional context, which focuses on the individual and that is not considered in the technology acceptance models available today. This new consciousness has been achieved by merging accepted knowledge from organisational, individual and societal perspectives. This holistic approach led to the conclusion that individuals' subjective interpretation of a situation of technological change, in combination with their individually different composition of self-integrity, is a significant indicators for technology acceptance behaviour. This new perspective takes into account individually different cognitive-affective meaning systems that hold various group- and role-identities, which guide and limit behaviour in socially recognised categories, but are also influenced by an individual's personal identity. These three identity types may operate simultaneously in one situation to influence behaviour. When studied together, they show how individuals are constrained by social identities' normative or structural frames but how they also have some choice in their enactment through personal identity. Depending on the situation and on the individual, some identities become central in a hierarchy of identities and others are not present. The unique combination and salience of social- and personal-identities determine the degree of role- or group-compliant behaviour. Altogether, a cross-disciplinary model emerged that explains the hard to understand invariance of personality combined with the variability of technology acceptance behaviour across situations. In addition to the overall cross-disciplinary conceptionalisation of a cognitive-affective meaning system, individual perspectives (Part III, Chapter 5) have shown that unpredictable and confusing behaviour may result in a struggle between the sometimes opposite forces of various parallel identities. Behaviour may be very consistent and assured when it is based on correlating values of parallel-activated group-, role- and personal-identity, tying all three levels of identification into one, coherent action. On the contrary, when meanings and expectations associated with a social-identity conflict with the meanings of personal-identity, or when social-identities conflict with each other, individuals may ignore role- or group-identity to maintain personal-identity or the other way around. This behaviour may be understood as a balancing act to retain some form of self-integrity, because individuals tend to behave in coherence with their self-concepts and identity schemes. When dissonance occurs, the individual may

consciously or subconsciously act in order to protect his or her self and self-concept. These self-integrity processes are sources for behaviour that seem unpredictable and confusing for an unaware observer. The analysis further highlights identity theory as a possible approach to make these hidden self-processes identifiable.

The impact of society and social reality on self-concepts and identity schemes appear to be unveiled in societal perspectives (Part III, Chapter 6). Technological change as a source for social change and a source for imbalance is another consideration from the societal chapter. Furthermore, the 20th and 21st centuries were identified as centuries of increasing personal choices for acceptable self-concepts and identity schemes, at the cost of loss of a clear cultural and moral guidance for behaviour. The loss of one uniform social reality and meaning leaves it up to the individual to find a coherent sense of self out of a range of options. The organisational perspective (Part III, Chapter 7) offers additional, selected organisational structures that offer formations for identity generation, such as professions, disciplines, organisational cultures and career anchors. They may all contribute to an individual's overall self-concept. Part III, Chapter 8, concluded that perhaps many technologically mediated changes of the 21st century affect the individual's sense of self-integrity, with a direct impact on feelings of stability or instability. It is this spectrum of change, the individual interpretation of this change and its consequences on well-being that emerged as the new centre of this research studies research problem, thus it became an area of attention for further, empirical investigations.

Overall, a consciousness emerged that understanding an individual's active identities and these identities' hierarchical order in a situation of technological change may be a key to gaining insight in the social and individualistic forces that contribute to behaviour in disruptive technology acceptance in the mechatronics machine design.

Studying a sample of twenty-two mechatronics machine design engineers and technicians (Part IV, Chapter 9, 10), this study discovered a technology adoption typology for mechatronics machine designers. Only participants who did not hold central group identification in the organisational working context actively pushed or rejected a technology and engaged in individualistic behaviour, independent from organisationally 'correct' behaviour. All participants who held a central work related group-identity engaged in conforming technology acceptance behaviour, which means they eventually accepted group or management decisions. Furthermore, conflicting group- and role-identities activated in parallel offer insight into contradicting forces that might lead to inconsistent behaviour. Finally, and in contrast to existing explanations, participants that actively pushed a new technology were the same individuals that take the freedom to actively reject a new technology.

In order to determine more precisely at what point in time an individual will adopt a technology within the individualistic or conforming spectrum, the individual's central identities offer deep insights, because they are tightly related to an individual's self-concept and feelings of self-integrity.

Within the industry sector of mechatronics machinery construction and the profession of designers, seven not mutually exclusive, work related identity-content groups emerged.

- Technical competence identity
- Technical competitive challenge identity
- Technical knowledge challenge identity
- Security and safety identity
- Managerial competence identity
- Managerial competitive challenge identity
- Work-life balance identity

Depending on the individually unique combination of dominant identities and the degree of complementing or competing content, one may be able to differentiate those individuals who adopt early within the conforming spectrum, those who adopt at the mean of overall adoption, and those who are reluctant to adopt, but who will finally give in to the adoption decision. Furthermore, this typology may indicate when individualistic behaving individuals will endorse and when they will reject a technology.

All participants held an identity of technical competence, a professional identity of the participants. New technology may enhance this identity, but comprises the risk to lose competence, status and prestige in the short term. This identity was combined with other identities. Individuals, who had a central identity of technical or managerial competitive challenge adopted technology prior to all others or not at all. They were competitively driven by a personal goal and new technology was judged by its ability to support this goal. A slightly different group were technically challenge identities, who were not driven by competition but by curiosity. They were eager to learn about something new, but this drive was balanced by other parallel identities. Thus, these individuals adopted early to medium in a mainstream, conforming fashion. In contrast, individuals who were driven by a need for security and stability were reluctant to adopt new technology, however, their parallel identities, e.g. that of technical competence mediated the reluctance to a varying degree. They adopted between an average and very late time-frame within the conforming spectrum. Finally, individuals who hold an identity of work-life balance were complex multi-identity individuals that were found to be rather stress-prone at work. They adapted in early to medium time–frames within the conforming spectrum, and did not take technology or themselves too serious. Overall, when multiple identities were active in parallel, they functioned as a vector addition as stated by Stets and Burke (2003, p.24), which explains the broad variety of resulting behaviour in a situation of seemingly identical external factors.

This study added a significant new dimension to technology acceptance research. It demonstrated the importance of an individual's subjective interpretation of a situation of technological change. This information acknowledges the existence of subconscious action and the influence of society and 'common knowledge' on what appeared to be a free will.

The new understanding of technology acceptance behaviour and identity theory application leads to recommendations for theory and practice. Existing theoretical knowledge in technology acceptance theory can gain further depth from paying attention to individuals' subjective meaning, attained to a technology. The interpretation of a situation of technological change can be accessed and understood by applying the latest knowledge from a 'meaning system approach' based identity theory. This additional perspective offers access to cognitive, emotional, self-concept and self-esteem related aspects of individual behaviour that all mirror the unique, individual mixture of social, organisational and individual influences that are part of individuals' complex working reality.

Recommendations for practice are rich and cover technology vendors as well as technology implementing companies and their change managers. These recommendations follow the technology adoption concepts of Rogers (1995) and Moore (1999) that have been discussed among the existing models, and takes them further. Whether one develops new technology for a particular market, or one wants to modify an existing work process with a new technology, in both cases one should seek to understand the work related identities of the targeted groups of users.