Modelling the antecedents of Innovative Work Behaviour

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Summary

This thesis has provided an answer to a question regarding the theoretic relation between the antecedents of proactive work behaviour and proactive work behaviour, this question was:

"Which variables should be added to relate job and personality characteristics to Innovative Work Behaviour and to improve the model presented by Parker, Williams, & Turner (2006)*?"*

This thesis has answered the research question in a number of steps. The first step was to discuss the model presented by Parker et al (2006).

Parker et al (2006) argue that the antecedents of individual proactive work behaviour (which can be seen as a collection of self-starting, future oriented behaviours) can be modelled with a number of mediating states that reflect the role orientation and self-efficacy of a person. Parker et al divide the antecedents of proactive work behaviour into two separate groups: individual differences and the perceived work environment of an individual. Individual differences reflect differences between individual employees, while the perceived work environment describes how the work environment is perceived by the individual employee. Measures for these groups were: a proactive personality measure, used to measure individual differences; and a measure of the amount of autonomy of an individual, together with a measure of co-worker trust among workers for the perceived work environment of an employee. The model also hypothesised a third variable (supportive supervision) to relate to proactive work behaviour, however the hypothesised relation was not empirically proven, and therefore this third criterion is not considered in this summary.

The effects of these antecedents on proactive work behaviour were affected by two mediating states: the amount of self-efficacy regarding the amount of tasks an employee can complete successfully, because it raises one's feelings of control and it increases the perceived likelihood of success; and the role orientation of an employee since an increased role orientation increases the amount of personal responsibility felt by an individual for a broader range of goals and, therefore, the individual will feel a sense of accomplishment when helping to achieve these goals through proactive behaviour.

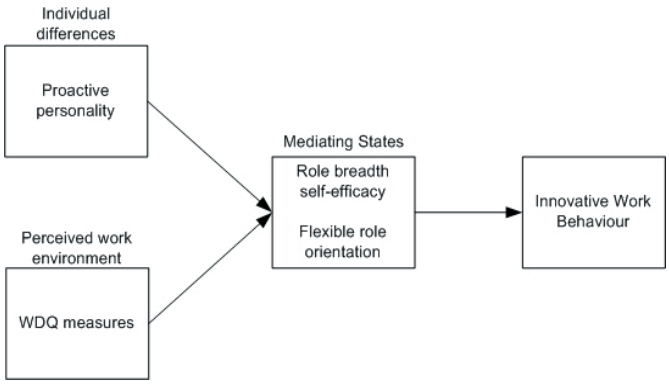
The second step was to make a comparative analysis of the model presented by Parker et al with the most common used historical model that measured the effects of job design on a wanted outcome (the Job Characteristics Model). This analysis showed that the amount of criteria used for measuring the perceived work environment of an individual in the model proposed by Parker et al was too low and therefore a weakness. Because a limited amount of criteria in the measure for the perceived work environment, creates less opportunities for more fine grained modifications to work design, i.e. increasing the number of criteria should increase r^2 of the model. The measure for individual differences was identified as a strength of the model proposed by Parker et al, because it did not show significant correlation with social desirability.

The amount of criteria that could be used to measure the perceived work environment was increased using the Work Design Questionnaire by Morgeson & Humprey (2006). This questionnaire increased the total number of criteria used to measure the perceived work environment from two to twenty-one. Further research is needed to relate all the WDQ criteria to the mediating states in the model, this is not done in this thesis because that would be out of the time and scope of this research. A comparison with earlier research on IWB has shown that the WDQ criteria have been used successfully as antecedents of IWB before, however, no scholar has put these criteria together into one model.

The third step in this thesis was to identify a relation between proactive behaviour and IWB, because the research goal was to provide an improved model on the relation between job and personality characteristics and innovative work behaviour, based on the model presented by Parker, et al (2006). To identify a relation between proactive work behaviour and IWB this thesis started with providing

the definition of innovation, which was defined as the process of engaging in behaviours designed to generate and implement new ideas. Innovative Work Behaviour was accordingly defined as: an individual's behaviour that aims to achieve the initiation and intentional introduction of new and useful ideas, processes, products or procedures. IWB was shown as a four stage process that included problem identification, idea generation, championing, and idea realisation, more important IWB was seen as a behaviour and hence self-starting.The next step was to define proactivity, proactivity was roughly defined as types of behaviours that are both self-starting and future oriented. As a consequence of this definition proactive work behaviour was defined as taking initiative to improve current circumstances, or challenge a status quo. These definitions, together with the remark by Parker et al on the fact that pressure for innovation increases the need for proactivity, lead to the conclusion that proactivity can be seen as an antecedent of innovation, because both definitions include self starting, future oriented behaviour, hence IWB is in fact no more than just another form of proactive work behaviour and could therefore be substituted for proactive work behaviour in the improved model of Parker et al.

Hence the new model for the antecedents of IWB is presented below.



This means that the research question can be answered as follows: The number of criteria in the measure for the perceived work environment needs to be increased using the Work Design Questionnaire, to improve the model (r^2 should increase). Furthermore Innovative Work Behaviour can be set in the place of proactive work behaviour in the model by Parker et al. This makes the newly presented model suitable for relating job and personality characteristics to Innovative Work Behaviour.
The newly presented model of antecedents of Innovative Work Behaviour has some consequences both scientifically and for managers. Scientific consequences involve a switch in level of analysis for work design to include the individual level of analysis together with the job level of analysis, because the model of antecedents of Innovative Work Behaviour presented in this thesis has shown that individual differences and the work environment both matter, this insiht asks for a review of current literature on work design to include the individual level of analysis. The relation between the mediating states and the criteria used to measure the perceived work environment needs to be researched as well.

The newly presented model of antecedents of Innovative Work behaviour also has some managerial consequences. This thesis argues that individuals can become more innovative in their work through two sorts of antecedents: individual differences and the perceived work environment of an individual. This means that if a manager wants his or her employees to be more creative, the manager should take two things into consideration: the personality and other psychological characteristics of the employee (such as self-efficacy or role orientation), and the work environment of the individual. This in turn has some consequences for recruiting employees, because managers need to consider the

individual differences as wel, for example a manager can use the measure for proactive personality proposed in this thesis to identify employees that have a proactive personality, hence employees that have the possibility of engaging in Innovative Work Behaviour. The final consequence of this thesis is that managers have a choice regarding the amount of employees that engage in Innovative Work Behaviour they want. This choice is relevant because these 'innovative' employees constantly challenge the status quo and might therefore not be as efficient in the short term as they are in the long term.

Samenvatting

Als extra eis aan Bacheloropdrachten Technische Bedrijfskunde geschreven in Duits of Engels wordt een Nederlandse samenvatting gevraagd. Deze samenvatting is een verkorte weergave in het Nederlands van deze, voor de rest in het Engels geschreven, Bacheloropdracht Technische Bedrijfskunde.

Dit onderzoek heeft een antwoord gegeven op de volgende onderzoeksvraag, betreffende de theoretische relatie tussen antecedenten van proactief werkgedrag en proactief werkgedrag:

"Welke variabelen kunnen worden toegevoegd aan het model dat gepresenteerd is door Parker et al (2006) om baan- en persoonlijkheidskenmerken te koppelen aan innovatief werkgedrag?"

Het antwoord op deze onderzoeksvraag is geformuleerd door een aantal stappen te zetten. De eerste stap was het uitleggen van het model van Parker et al (2006)

Parker et al (2006) modelleren de antecedenten van individueel proactief werkgedrag (wat gedefinieerd is als zelfstartende, op de toekomst gerichte gedragsvormen) als gemedieerde antecedenten van proactief werk gedrag. Dit houdt in dat de effecten van de antecedenten op proactief werk gedrag gemedieerd worden door een aantal opvattingen van werknemers. Parker et al delen de antecedenten van proactief werkgedrag in twee categorieën: individuele verschillen en de door de werknemer ervaring werkomgeving (bijvoorbeeld de mate van autonomie van een werknemer voor het maken van werkplanningen of de stijl van de leidinggevende van de werknemer). De individuele verschillen tussen werknemers worden door Parker et al gemeten door gebruik te maken van een meetinstrument voor de proactieve persoonlijkheid van een werknemer. De ervaren werkomgeving van een werknemer door Parker et al wordt gemeten aan de hand van twee criteria: de mate van autonomie van een werknemer en de mate van vertrouwen in zijn mede-werknemers. Parker et al hadden een derde criterium verwacht dat ook zou relateren aan proactief werkgedrag via de mediërende variabelen. Empirische analyse toonde echter aan dat dit criterium (de mate van ondersteuning door de leidinggevende) niet significant was gerelateerd aan proactief werkgedrag. Daarom is dit derde criterium in deze samenvatting buiten beschouwing gelaten.

De effecten van deze antecedenten worden beïnvloed door twee verschillende ideeën van de werknemer. Deze ideeën zijn: de hoeveelheid zelfvertrouwen die de werknemer heeft ten aanzien van het aantal taken dat de werknemer op zich neemt en de oriëntatie van de werknemer ten aanzien van het aantal taken dat tot zijn eigen taakomschrijving behoort. De hoeveelheid zelfvertrouwen zou van invloed zijn op de relatie tussen de antecedenten van proactief werkgedrag en proactief werkgedrag omdat meer zelfvertrouwen zorgt voor een groter gevoel van controle en een toename in de verwachting van het daadwerkelijk succesvol afronden van de taken van de werknemer. De visie van de werknemer op het aantal taken dat tot zijn taakomschrijving behoort is van invloed op de relatie tussen de antecedenten van proactief werkgedrag en proactief werkgedrag, omdat wanneer een werknemer denkt dat er meer taken tot zijn eigen takenpakket behoren, de werknemer ook eerder de verantwoordelijkheid zal nemen voor deze taken doordat het volbrengen van deze taken middels proactief werkgedrag meer arbeidssatisfactie zal opleveren.

De tweede stap in dit onderzoek was om het model van Parker et al te vergelijken met het meest gebruikte model in de historie van werk- en baanontwerp. Dit model is gevonden door een kort overzicht van de geschiedenis van baan- en werkontwerp methodieken te schetsen. Uit deze analyse kwam het 'Job Characteristics Model' van Hackman, Oldham, Janson, & Purdy (1975) als meest gebruikte historische model naar voren. Dit 'Job Characteristics Model' is gebruikt in een vergelijking met het model van Parker et al. Deze vergelijking wees uit dat de opdeling van de antecedenten in het model van Parker et al een sterke en een zwakke kant had. De sterke kant was het meetinstrument voor de proactieve persoonlijkheid van een werknemer, omdat verschillende studies

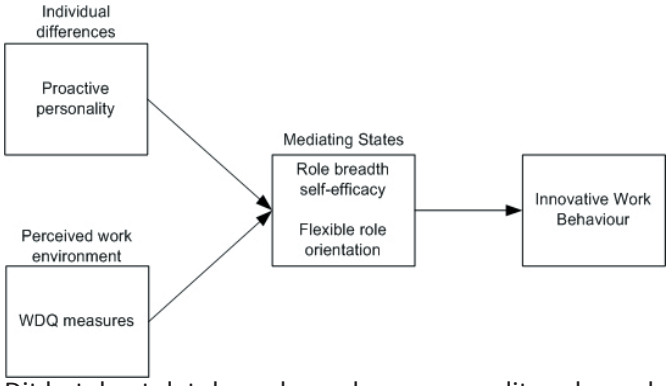
hebben aangetoond dat dit meetinstrument geen sociaal wenselijke antwoorden genereerd. Een zwakkere kant van de antecedenten zat in de hoeveelheid criteria dat was gebruikt om de ervaren werkomgeving van de werknemer te meten (twee). Dit werd als een zwaktepunt gezien omdat het toevoegen van meer variabelen aan het meetinstrument voor de ervaren werkomgeving zou moeten leiden tot een vergroting van de fractie verklaarde variantie (r^2) van het model van Parker et al en er daarnaast meer mogelijkheden ontstaan om baanontwerpen zodanig aan te passen dat de baan bijvoorbeeld proactief werkgedrag stimuleert.

Dit onderzoek beargumenteerd dat de hoeveelheid criteria voor de ervaren werkomgeving van de werknemer kan worden verhoogd door gebruik te maken van de 'Work Design Questionnaire'. Deze enquête toets eenentwintig verschillende criteria die allemaal te maken hebben met de werkomgeving van een werknemer en verhoogd daarmee het aantal mogelijkheden voor het aanpassen van het baanontwerp aanzienlijk en daarmee hopelijk ook de fractie verklaarde variantie. Toekomstig onderzoek zal moeten uitwijzen of alle eenentwintig criteria daadwerkelijk theoretisch en empirisch gerelateerd kunnen worden aan de beïnvloedende ideeën van een werknemer. Gelukkig laat een korte vergelijking met andere modellen van antecedenten van innovatief werkgedrag zien dat de criteria uit de 'Work Design Questionnaire' al succesvol in verband zijn gebracht met innovatief werkgedrag. Echter geen enkele onderzoeker heeft tot op heden geprobeerd om het verband tussen alle criteria van de 'Work Design Questionnaire' en innovatief werkgedrag te onderzoeken.

De derde stap in dit onderzoek was om een relatie aan te tonen tussen proactief werkgedrag en innovatief werkgedrag. Deze stap was nodig omdat het doel van dit onderzoek het presenteren van een nieuw en verbeterd model van innovatief werkgedrag op basis van het model van Parker et al is. De derde stap begon met het definiëren van innovativiteit als: het gedrag dat werknemers gaan vertonen wanneer zij nieuwe ideeën ten aanzien van processen, producten of services willen gaan genereren of implementeren, ongeacht de uitkomst van het gedrag. Innovatief werkgedrag wordt vervolgens gedefinieerd als: het gedrag van een individu dat bedoeld is om bewust nieuwe, ideeën, processen, producten, services of procedures te implementeren. Innovatief werkgedrag is verder gedefinieerd als een vier fasen proces dat bestaat uit: probleem identificatie, idee genereren, het zoeken naar ondersteuning voor het nieuwe idee en als laatste idee realiseren, belangrijker is echter dat innovatief werkgedrag een gedragsvorm is en daarmee in principe zelfstartend is, het proces van innoveren zorgt daarbij voor de benodigde positieve toekomstvisie voor de werkgever.Proactiviteit werd gedefinieerd als gedragsvormen die zelfstartend zijn en een voor de werkgever positieve toekomstvisie hebben. Proactief werkgedrag is gedefinieerd als een gedragsvorm die bedoeld is om initiatief te nemen om een huidige (werk)situatie te verbeteren of een status quo te doorbreken, dus met de kenmerken van proactief werkgedrag zijn: zelfstartend en met een toekomstgerichte visie. Tesamen met deze definities wordt een statement van Parker et al als tweede bewijs voor een relatie tussen proactiviteit en innovativiteit aangedragen. De statement van Parker et al zegt dat druk om te innoveren de behoefte tot proactiviteit doet toenemen. Deze twee zaken samen dragen bij tot de conclusie dat proactief werkgedrag in het model van Parker et al dus eigenlijk ook kan duiden op innovatief werkgedrag zoals gedefinieerd in dit onderzoek en daardoor proactief werkgedrag in het model van Parker dus kan worden vervangen door innovatief werkgedrag.

Hierdoor ontstaat het beoogde eindresultaat voor dit onderzoek, namelijk een nieuw model van antecedenten van innovatief werkgedrag:

Samenvatting



Dit betekent dat de onderzoeksvraag van dit onderzoek als volgt kan worden beantwoord: het aantal criteria dat de ervaren werkomgeving van een werknemer meet kan worden verhoogd door de criteria van de 'Work Design Questionnaire' te gebruiken. Daarnaast kan proactief werkgedrag in het model van Parker et al worden vervangen door innovatief werkgedrag. Hiermee zijn baan- en persoon lijkheidskenmerken gerelateerd aan innovatief werkgedrag door gebruik te maken van het model van Parker et al.

De consequenties van dit nieuwe model van de antecedenten van innovatief werkgedrag hebben invloed op zowel toekomstig wetenschappelijk onderzoek als op beslissingen die managers moeten nemen ten aanzien van hun werknemers. Toekomstig wetenschappelijk onderzoek naar baan- of werkontwerp zal zich, naast de taakomschrijvingen en het baanniveau, ook op het individu moeten richten, zoals aangetoond in dit onderzoek zijn namelijk beide, de werkomgeving en verschillen tussen individuen erg belangrijk om werknemers zover te krijgen dat zij innovatief werkgedrag gaan vertonen. Daarnaast is er meer onderzoek nodig waarin de relatie tussen de criteria van de 'Work Design Questionnaire' en de beïnvloedende variabelen theoretisch wordt onderzocht en empirisch wordt getest.

Naast een aantal wetenschappelijke consequenties heeft het nieuwe model van antecedenten van innovatief werkgedrag ook consequenties voor managers. Uit dit onderzoek is gebleken dat voor het stimuleren van werknemers om innovatief werkgedrag te vertonen er twee soorten antecedenten nodig zijn: een geschikte persoonlijkheid en psychologische kenmerken (bijvoorbeeld voldoende zelfvertrouwen); en een voor de werknemer stimulerende werkomgeving. Dit betekent dat wanneer een manager besluit dat hij of zij meer werknemers nodig heeft die zich innovatief gaan gedragen, dat de manager daarin rekening moet houden met zowel de persoonlijkheid en psychologische kenmerken van de werknemers, als de werkomgeving van deze werknemers. Dit betekent echter ook dat managers dus een keuze hebben met het aantrekken van nieuw personeel. Door gebruik te maken van bijvoorbeeld het meetinstrument voor proactieve persoonlijkheid kan een manager dus kiezen of de manager een werknemer met f zonder proactieve persoonlijkheid wil binnenhalen. De keuze voor een werknemer met een bepaald type persoonlijkheid maakt een andere keuze mogelijk voor de manager. Deze keuze gaat namelijk over hoeveel werknemers met innovatief werkgedrag de manager wil. De achterliggende reden voor deze keuze is dat innovatieve werknemers vaak meer bezig zijn met het verbeteren van hun huidige werksituatie dan met de daadwerkelijke productie. Dit betekent dat innovatieve werknemers dus meer winst kunnen genereren op langere dan korte termijn, waardoor de manager dus een afweging moet maken tussen de hoeveelheid innovatieve en de hoeveelheid niet innovatieve werknemers.

Acknowledgements

The work on this thesis started in November 2009, when I first met with Maarten to find a subject for my Bachelor assignment. I did not know at that point in time what subject would be the basis of the thesis that lies in front of you. I only knew I wanted Maarten as one of the teachers to be involved in the execution of my Bachelor thesis assignment, because he is one of the most honest critics I know.

We started out with a story about a friend of mine who is currently working as a car mechanic in Hoorn, the Netherlands. I told Maarten the following story: the friend was overly qualified for his job as a car mechanic (i.e. he had a HAVO certificate and had tried to join the Amsterdam police force). I also told Maarten about the fact that I was wondering why my friend could be so happy with his job as a car mechanic, while he had much better qualifications (car mechanic is a MBO certified education). Maarten told me to read a few articles on job enrichment and expectancy theory, which I did and thus my interest for work design grew.

After some time Maarten advised me to give a more detailed prescription of what I wanted to research in the time allowed for the Industrial Engineering & Management BSc thesis. He suggested that I should check the 'Competenties voor Innovatievie' project and he directed me to other staff members within the OOHR capacity group, which lead to my first conversation with André, who eventually was enthusiastic enough to become my second supervisor.

After reading a number of introductory publications for the innovation literature, kindly suggested by André, the three of us sat together to start on an assignment that would lead to this thesis. Over the time I had read quite a few articles already, so Maarten and André suggested I started with a comparison between the article of Parker, Williams, & Turner and Morgeson & Humprey. Full of my usual initial enthusiasm I began this assignment, and within a few weeks I had figured that comparing two articles involves quite an extensive amount of time, knowledge and motivation. However through the comparison between the two publications mentioned above I learned the real value of theory. For which I am really grateful, and above all, the newly gained insight in the use of theory has certainly contributed in writing his thesis.

Therefore Maarten and André thanks for all your time, effort, support, the endless stream of suggestions for relevant articles, and most importantly the valuable insights you gave me regarding the use of theory!!!

Naturally there are many more persons important in the formation of this thesis. For example my roommates in Capitool D-201: Adrián (my companion for every bad joke I've made in our room, but far more important, you were a great support with your academic view on my work), Sara & Marleen (you were really needed to keep me and Adrián on the right track, and you were a real support in the times I found it hard to motivate myself), Eva & Gijs (thanks for the great conversations about life after studying, and making me feel comfortable and at home in D-201), Koos & Tim (for all the wonderful conversations and brilliant jokes you had). I wish you all the best of luck with your future careers and I hope we will continue our tradition of having a D-201 bowling game!

Second my friends from Stress (my study association), Twente Academy, and my colleagues from 't Spoor. You all gave my the pleasure I needed to continue my work on this thesis. I especially want to thank my friends Martin & Casper for providing a motivation to finish my thesis before they did!!

Third, but certainly not least, I would like to thank my parents, sister, uncles, and other relatives that have supported me all the way through this process. Without your listening abilities and unconditional support this thesis would not have been possible.

Unfortunately this page is way too short to thank everybody who was helped me in the process of writing this thesis. Therefore I would like to thank everyone who has contributed to the process of writing this thesis, but has not been explicitly mentioned, for your support and contributions to the wonderful time I've had writing this thesis.

Sean Straatman
June 10th, 2010

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Acronyms

- α = Cronbach's α
- β = Regression coefficient of independent variable X to dependent variable Y
- CFA = Confirmatory Factor Analysis
- CFI = Comparative Fit Index
- HR = Human Resource
- HRM = Human Resource Management
- IWB = Innovative Work Behaviour
- JDS = Job Diagnostic Survey
- JCM = Job Characteristics Model
- MJDQ = Multimethod Job Design Questionairre
- N = total population size, in persons
- O*NET = American online database on occupational data
- p = p-value of variable X
- r = correlation coefficient of independent variable X to dependent variable Y
- r^2 = portion of variance in variable Y explained by variance in variable X and vice versa
- RMSEA = Root-Mean-Square error of approximation
- SRMR = Standardized Root Mean Square residual
- WDQ = Work Design Questionnaire

Introduction

This paragraph will provide a starting point and a short explanation on the starting point for this thesis.

Innovation has been shown to create new technological possibilities as a result of research in different domains, for example in the domain of Human Resource Management (HRM). HRM scientists have studied Innovative Work Behaviour (IWB) as a part of the HRM contribution to improving innovation. Most scholars (e.g. Scott & Bruce, 1994; Janssen, 2000; De Jong & Den Hartog, 2010) agree that problem identification and idea generation are important first steps in the IWB process. These first steps are followed by a step in which an individual needs to gain support for his or her innovation and finally a step wherein the individual actually stays involved with the prototyping or implementation of the new innovation. Previous literature on IWB has focussed on identifying distinct dimensions for the described steps of the IWB process, and on measurement of these dimensions (such as problem identification and idea generation). In doing this, some scholars tried to identify antecedents of this IWB process (e.g. Huiskamp, De Jong, & Den Hoedt, 2008; De Jong & Den Hartog, 2010). However most scholars have not given the antecedents of the IWB process enough attention or they only investigated antecedents using a job level for their analysis.

This poses a problem for scholars because the process is called Innovative Work *Behaviour*, which implies that individuals are an important part of the IWB process as well. Hence antecedents derived from individuals are just as important for consideration when the antecedents of IWB are researched and the level of analysis should be both the individual level of analysis and the job level of analysis.

Furthermore, as mentioned before, scholars are currently struggling with measurement of the distinctness of the dimensions of IWB. An increase in the understanding of the antecedents of the IWB process, might increase the possibilities for defining better measures of IWB that comply to the distinctness of the dimensions of IWB.

Fortunately recent work (Huiskamp et al, 2008) has shown that there are different groups of variables that can explain variance in IWB. Huiskamp et al define four different groups of variables: Human Resource (HR) motivating policies, HR policies that offer scope, the individual capabilities of an employee, and the social environment of an employee. HR motivating policies are policies that are meant to challenge employees into IWB, for example the amount of challenges an individual has in his or her work or the amount of transformative leadership the leader of the employee has. HR policies that offer scope are those policies that are meant to provide a scope for conducting IWB, such as the amount of formalisation or custom work agreements. Based on a survey that was part of a research that identified self-management as a consequence of trust in own capabilities and new HRM policies ($N = 480$, $r^2 = .44$), Huiskamp et al conclude that motivational HR policies offer a greater contribution to IWB ($\beta = .15$ for amount of challenges and $\beta = .18$ for transformative leadership) than HR policies that offer scope ($\beta = -.10$ for formalisation and $\beta = .11$ for custom work agreements). Huiskamp et al also found that an employee with a proactive attitude displays more IWB than those without a proactive attitude.

This last conclusion offers an interesting viewing point, because researchers have remarked that there should be a connection between proactivity and IWB (e.g. Crant, 2000; Unsworth & Parker, 2003), but the same researchers have not provided an theoretical explanation or empirical test of this relation, because they have concentrated on the consequences of IWB (e.g. Parker, 1998). Furthermore both proactivity research and IWB research have developed parallel to each other, often these two researches have not been combined into the relationship hypothesised and proven by Huiskamp et al (2008). This might present an opportunity for new research because a proactive attitude can be seen as an antecedent of IWB (Parker, Williams, & Turner, 2006). Furthermore proactivity research acknowledges that antecedents of proactive work behaviour can be divided into two separate

categories: the perceived work environment of an individual and individual differences among individuals (Parker et al, 2006). Hence a combining proactivity research with IWB might be useful to generate antecedents of IWB, that contribute in the search for new measures of IWB.

Another factor that needs to be taken into consideration when the level of analysis for the antecedents of IWB includes the individual is that those antecedents may be mediated through one or more mediating states. Previous literature has discussed the perceived work environment of an employee or individual differences among employees that were influenced by mediating states (e.g. Hackman, Oldham, Purdy, & Janson, 1975), however empirical evidence did not show a significant relation between the antecedents having a mediated effect over the wanted outcome. Proactivity research (Parker et al, 2006) has shown that these mediating states are important for proactive behaviour and more importantly their effect can be shown using empirical evidence.

This thesis therefore will concentrate on combining IWB and proactivity, hence creating a model of antecedents that have a mediated relation with IWB. The basis for this model can be found in the model presented by Parker et al (2006), because this model successfully relates mediated antecedents to proactive work behaviour, the model therefore seems to be an interesting starting point. The antecedents used by Parker et al are roughly divided into two categories: individual differences and the perceived work environment. The model of Parker et al will be discussed in the next chapter.

Research structure

This paragraph will provide an overview of the research structure in this thesis. The paragraph starts with outlining the research goal of this thesis, then the central research question will be introduced. Finally the structure of this thesis will be explained based on the central research question for this thesis.

This thesis will attempt to provide a theoretical background to the relation of mediated antecedents of IWB. Mediating states were identified using the model of antecedents of proactive work behaviour by Parker et al (2006). As mentioned before, the antecedents for proactive work behaviour used by Parker et al, and the antecedents of IWB found by Huiskamp et al (2008) were split up in different categories. The distinction used by Parker et al (2006) will be used in the new model of antecedents of IWB, because it has been used in both IWB and proactivity research. The main research goal of this thesis is therefore:

"to provide an improved model on the relation between job and personality characteristics and Innovative Work Behaviour, based on the model presented by Parker, Williams, & Turner (2006)."

The main research goal is achieved when the following research question regarding the theoretic relation between the antecedents of proactive work behaviour and proactive work behaviour is answered:

"Which variables should be added to relate job and personality characteristics to Innovative Work Behaviour and to improve the model presented by Parker et al (2006)*?"*

This research question will be answered using a number of steps. The first step is to present the model by Parker et al and compare the model to relevant historical predecessors to identify any strengths or weaknesses it might have compared to its historical predecessors. The second step will concentrate on improving the model by Parker et al using a model of interdisciplinary work design. The third step is to identify the relation between the proactive outcome of the model of Parker et al (2006) and the relation between this proactive outcome and innovative working behaviour. The fourth step will present an improved model, based on the model of Parker et al (2006), that relates

personality and work characteristics to Innovative Work Behaviour. Finally the new model will be compared to recent research on the antecedents of Innovative Work Behaviour and a number of consequences of the model will be discussed.

The model that is presented will not be verified using data analysis, its underpinnings are purely theoretical, further research is required to test the model.

Problem analysis

In this chapter the model proposed by Parker et al (2006) will be described. Furthermore the described model will be compared to the most important historical predecessor to indentify the strengths and weaknesses of the model presented by Parker et al.

The model by Parker et al (2006)

In this paragraph the model proposed by Parker et al (2006) will be discussed.

Theoretical arguments for the model

Parker et al reflect on the need for proactivity as a consequence of pressure for innovation. The model presented in their publication provides an overview of antecedents that affect proactive behaviour at work, which is in line with existing theory, but also adds to existing theory because it provides prove that this relation is mediated by proactive cognitive-motivational states (i.e. role breadth self-efficacy and flexible role orientation). The model will be discussed very briefly, before moving on to a more detailed explanation on its relevance for existing literature.

As said before, the model presents two forms of antecedents of any type of behaviour: individual differences and the perceived work environment, the idea of two types of antecedents for behaviour has only recently been found (Frese & Fay, 2001). Subsequently Parker et al argue that these antecedents have a mediated effect on proactive work behaviour, i.e. the perception of an individual regarding his or her capabilities to complete a range of tasks and the perception of an individual regarding the amount of tasks he or she feels responsible for in his or her job have an effect that combined with the perceived work environment and individual differences among inviduals, result in a type of behaviour that is self-starting and future oriented.

The model presented by Parker et al (2006) “concurs with Frese & Fay (2001) who, drawing on Kanfer (1992: quoted from Parker et al, 2006, p. 637), proposed personality and environment variables as distal causes of proactive behaviour that have an effect via more proximal variables such as self-efficacy” (p. 637). “Similarly Parker and colleagues (Parker, 1998;2000; Parker, Wall, & Jackson, 1997) suggested that antecedents like job autonomy affect states such as role breadth self-efficacy, which in turn, lead to proactive behaviour. This hypothesised role of such cognitive-motivational states is consistent with social-cognitive theory, which proposes that humans are reflective, self-regulating agents who are not only products but also producers of their environment (Bandura, 1982 quoted from: Parker, 2006, p. 637)” (p. 637). “The model of Parker et al (2006) differs from older theory because it argues that distal variables are mediated through cognitive-motivational states such as self-efficacy.” (Parker et al, 2006, p. 638). All elements of the model will be discussed in detail below. The final model can be found in Figure 1 below and was empirically tested using a sample of employees of a wire making firm (N=282), the employees worked in teams.

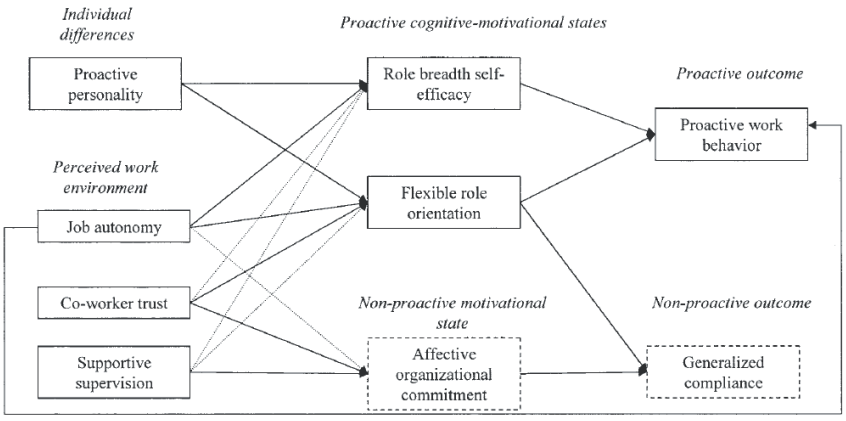

Figure 1: The final model of antecedents of proactive work behaviour (Parker et al, 2006, p.646), dotted lines were hypothesized relations, but these paths proved to be insignificant.

Proactive work behaviour is defined by Parker et al as: "taking initiative in improving current circumstances; it involves challenging the status quo rather than passively adapting to present conditions" (Crant, 2000, p. 436), put simpler: proactive work behaviour is a self-starting type of behaviour that is is meant to improve a situation in the future . When an employee engages in proactive work behaviour he or she does this without being explicitly told or as part of their own task, the outcome of the behaviour is future and improvement oriented, i.e. the outcome could be profitable in the future. Mostly engaging in proactive behaviour means challenging the status quo of a work situation with a future oriented approach, which can be perceived by other employees or managers as annoying because the problems that are identified using IWB may not have immediate consequences. Furthermore a managers should ask themselves how many proactive employees are needed, since the main focus of proactive employees is also on the future and on the present, which might lead to fewer results. This thesis will not provide an assessment of the amount of proactive workers needed in organisations, it stops in remarking that a workforce should consist of at least both: employees that are proactive and employees that are not proactive. Parker et al (2006) consider two dimensions of proactive work behaviour: proactive idea implementation and proactive problem solving. Definitions and measures of these dimensions are discussed further below and in the next paragraph.

Based on an analysis of existing research on proactive concepts, Parker et al identified two processes that are likely to underpin proactive work behaviour. First engaging in proactive behaviours is likely to involve a deliberate decision process in which the individual assesses the likely outcomes of these behaviours (p. 638). A second process that emerged from the analysis is that one 'approaches' proactive behaviour because one sees this behaviour as important for fulfilling one's responsibilities, goals, or aspirations (p. 638).

The measure for the first process is role breadth self –efficacy, which is a form of self efficacy. Self efficacy can be defined as: "one's judgement about one's capability to perform particular tasks" (p.638). Individuals with high self-efficacy tend to "carry out their tasks more effectively (Barling & Beattie, 1983) and persist at them (Lent, Brown, & Larkin, 1987), cope more effectively with change (Hill, Smith, & Mann, 1987), choose more difficult goals (Locke & Latham, 1990), and adopt more efficient task strategies (Wood, George-Falvy, & Debowski, 2001)." (p.638). Parker et al argue that self-efficacy is important for proactive behaviour "because it raises one's feelings of control and the perceived likelihood of success" (p.638). Parker et al concentrate on self-efficacy in a specific situation (i.e. the individuals' work situation), however rather than a specific situation with one single task Parker et al focus on a range of tasks. Put simpler: role breadth self-efficacy is the judgement of one

about one's capability to perform multiple tasks. Formally Parker et al define role breadth self-efficacy as: "one's perceived capability of carrying out a range of proactive, interpersonal, and integrative activities that extend beyond the prescribed technical core." (Parker, 1998). Role breadth self-efficacy has been shown to relate to proactive work performance (e.g. Griffin, Neal, & Parker, 2007) for different roles of an employee, for example on the individual level (r = .36).

The second process is measured using flexible role orientation. Flexible role orientation is defined as: "the breadth of experienced responsibility, or how far one's "psychological" role extends beyond achieving basic technical goals" (Parker et al, 2006, p. 639). Parker et al argue that employees with flexible role orientations are more likely to engage in proactive problem solving and the pursuit of improvement in domains beyond their narrow set of tasks, because they have a higher sense of personal responsibility for a broader range of goals and, therefore, will feel a sense of accomplishment when helping to achieve these goals through proactive behaviour. Furthermore Parker et al also hypothesised change orientation and control appraisals as important psychological states for promoting proactivity, these relations were insignificantly proven and therefore not taken into account in this thesis.

The distal antecedents chosen by Parker et al can be divided into two categories as well: the perceived work environment and individual differences, both are considered simultaneous in the model presented by Parker et al. The perceived work environment is measured using work environment antecedents, which are divided into job autonomy and a supportive climate, as advised for personal initiative by Frese & Fay (2001). The supportive climate is further divided into supportive supervision and co-worker trust. All these antecedents will be discussed briefly regarding their theoretical argumentation.

Parker et al (2006) argue that job autonomy is related to role breadth self-efficacy because the amount of controllability of a task by the individual performing that task influences self-efficacy, with more controllable tasks boosting self-efficacy. Furthermore job autonomy can raise self-efficacy through enactive mastery, enactive mastery refers to: "the repeated performance success experience" of an individual. Parker (1998) argued that autonomy provides a source of enactive mastery experience because it gives employees the opportunity to acquire new skills and master new responsibilities. Parker et al (2006) furthermore argue that job autonomy also promotes proactive behaviour via the development of flexible role orientations, because when individuals have an influence over a broader range of decisions, they develop ownership for those decisions and the longer term goals that they support.

Parker et al further argue that co-worker trust enhances trust of an individual in his/her own capabilities, which in turn encourages an employee to try things beyond his/her core tasks and enhance his/her role breadth self-efficacy, this relation was not proven ($\beta = .06$, $p > .05$). Parker et al also argue that an increase in trust embodies risk taking (McAllistar, 1995), individuals who feel trust in their co-workers are more likely to "take the risk", i.e. to feel ownership for those aspects broader than their own goals, which is the definition of flexible role orientation, this relation was proven ($\beta = .31$, $p < .01$).

Finally Parker et al (2006) argue that supportive leadership, that encourages employees to have high expectations, increases role breadth self-efficacy and that self observation and self goal setting (two types of supportive behaviour by managers to help individuals to be self-directed and self managing (Manz & Sims, 1987)) promote flexible role orientations. These relations were insignificantly proven (resp. $\beta = .06$ and $\beta = .01$, both $p > .05$ in Parker et al, 2006, p. 646).

Measures used to measure the model by Parker et al (2006)

Parker et al argue that the antecedents of proactive work behaviour can be split up in individual

differences and the perceived work environment of an employee. Individual differences were measured using the measure for proactive personality discussed by Bateman & Crant (1993). Proactive personality is defined as: "the relatively stable behavioural tendency to identify opportunities, show initiative, take action, and to persevere to bring about change" (Bateman & Crant, 1993). Items that were used by Parker et al to assess proactive personality were the four items with the highest loading from the measure for proactive personality by Bateman & Crant (1993), The differences in perceived work environment were measured using three very commonly used variables, i.e. (a) job autonomy, (b) co-worker trust and (c) supportive supervision. (a) Job autonomy was measured "using nine items concerning the extent to which the employee was involved in making decisions within the team, items were identified using literature on autonomous work groups" (Parker et al, 2006, p. 643). (b) Co-worker trust was assessed "by three items from Cook and Wall's (1980) measure of interpersonal trust as well as by an additional item to capture the most affect-based dimension of trust, which was recommended by McAllistar (1995: "there is a great deal of trust among members of my team")" (Parker et al, 2006, p. 643). (c) Supportive supervision was assessed "via four items from Manz and Sims' (1987) Self-Management Leadership Questionnaire. The items covered the four major aspects that were identified by Manz and Sims as enhancing leader effectiveness in a self-managing context." (Parker et al, 2006, p. 643). This self-managing context is important because Parker et al used a sample of wire makers that worked in teams, it is therefore argued that this measure could be changed if the sample requires it, e.g. when the sample consists of employees who work individually. The measure by Manz and Sims identified whether the supervisor encourages employees to engage in self-goal setting, self-reinforcement, self-expectation, and self-observation/evaluation." (Parker et al, 2006, p. 643).

In line with this argument, Parker et al propose individual differences and the perceived work environment as antecedents of a number of mediating states, these mediating states, in turn, affect the amount of proactive work behaviour of an individual.

The mediating states were: (a) Role breadth self-efficacy, (b) flexible role orientation and (c) affective organizational commitment. (a) Role breadth self efficacy was assessed using the seven highest loading items from Parker's (1998) measure of this construct. (b) Flexible role orientation was assessed using items adapted from Parker, Wall, and Jackson's (1997) measure of product ownership, that was designed to assess flexible role orientation.

The third mediating variable presented in Figure 1 is (c) affective organizational commitment, this variable, together with the generalized compliance outcome variable, was introduced for differential validity purposes, and the influences of the perceived work environment and individual differences on affective organizational commitment were therefore not discussed in the theoretical discussion of the model presented by Parker et al (2006). "Affective organizational commitment refers to the degree of identification, involvement, and emotional attachment that an individual has to his or her employing organization and was measured using six items from the extensively used Cook and Wall (1980) measure of commitment" (Parker et al, 2006, p. 641). Affective organizational commitment and flexible role orientation, result in generalized compliance. Generalized compliance refers to "scrupulous adherence to rules, regulations, and procedures, that although not necessarily helping any specific individual, can help the overall system" (p. 641). Generalized compliance was measured "using the four highest loading items, with slight adoptions from Smith, Organ, and Near's (1983) measure for generalized compliance." (Parker et al, 2006, p. 641).

The other outcome of the model, proactive work behaviour, was measured using two separate processes. The first process is proactive idea implementation, which is defined as: "an individual taking charge of an idea for improving the workplace, either by voicing the idea to others or by self-implementing the idea." (Parker et al, 2006, p. 637). The second process was proactive problem solving, which is defined as: "self-starting, future-oriented responses that aim to prevent

the reoccurrence of a problem (such as addressing its root cause) or that involve solving it in an unusual and nonstandard way." (Parker et al, 2006, p. 637). The measures that were used were context-appropriate measures because proactive behaviour tends to vary with context (Frese & Fay, 2001) and because relative to using value-laden general statements (e.g. "I make things happen"), a context-specific approach is more likely to result in a valid self-assessment because the socially desirable responses are less obvious (Parker et al, 2006, p. 642). Proactive idea implementation was measured using two steps (Parker et al, 2006, p. 642): first, individuals indicated how many new ideas they had in the last twelve months about each of five goals (those goals were: saving money or cutting down costs, improving quality, improving customer delivery times, making a better product, and working together effectively). Second if individuals did have at least one new idea they were asked whether they had (a) put the idea forward to anyone and , if so, to whom and (b) if those ideas were generally implemented and, if so, by whom. The scores on the proactive idea implementation variable varied from 0-2 reflecting different types of individuals: (0) an individual with no new ideas or no new ideas that were executed; (1) an individual with new ideas that were at least suggested to others or self-implemented the idea; (2) an individual that suggested a new idea to others and self-implemented it. Proactive problem solving was assessed using three problem-solving scenarios designed for the context. Individuals were asked what their response 'usually' would be. Each scenario had eight behavioural responses to choose from, individuals were allowed to pick more than one, but were instructed to "only pick things you would be very likely to do". The most proactive behaviours were identified by twenty external raters (ten organizational behaviour experts and ten managers from a range of organizations). When the twenty external raters decided which of the responses were the most proactive behaviours, Parker et al checked the occurrence of these responses to the given scenarios. Since proactive responses to problems are nonstandard and unusual responses, these options should be chosen relatively infrequently. This was the case in five of the seven identified proactive responses. These measures were included in the survey. Finally the scores on the proactive idea implementation and proactive problem solving variable were computed to a 0-1 proactive work behaviour variable via a standardization and summation technique (Parker et al, 2006, p. 643).

The measures for the cognitive motivational variables and antecedents used by Parker et al were proven as reliable measures[1]. The LISREL VIII programme[2] was used to indicate the model with hypothesised relationships and proven relationships (as depicted in Figure 1). Data that was used in the LISREL VIII analysis was collected using a survey that was given to 282 production employees in a wire-based manufacturing company; the response rate was 70%. Parker et al tested five different models: first the hypothesised model, with paths from (a) proactive personality to each cognitive motivational state, (b) work environment antecedents to each mediator and to commitment, (c) each cognitive-motivational mediator to proactive work behaviour, and (d) both commitment and flexible role orientation to generalized compliance; the second model was a non-mediated model in which pathways between antecedents and mediators were omitted and instead, the antecedents and mediators had direct links with both outcomes; third a partially mediated model, which was the first hypothesised model plus direct links between the antecedents and the proactive work behaviour; the fourth model was a hypothesised model plus each of the cognitive motivational mediators to generalized compliance and affective commitment to proactive work behaviour; the fifth and final model was the hypothesised model plus a path from job autonomy to proactive behaviour. Results testing the different models indicated the fifth model as the best model to fit the data. Results of the tests can be found in Table 1 below and will be discussed next.

[1]All α>.70

[2]LISREL VIII is a Structural Equation Modelling programme.

Model	χ^2	*df*	χ^2/df [3]	*SRMR* [4]	*CFI* [5]	$\Delta\chi^2$	Δdf
hypothesised	22.36	14	1.59	.028	.98	-	-
2	205.90	25	8.24	.16	.67	183.74	11
3	10.05	10	1.00	.020	1.00	12.11	4
4	19.02	10	1.90	.025	.99	3.14	4
final	10.53	13	0.81	.020	1.00	11.69	1

Table 1: Results of LISREL Fit statistics (Parker et al, 2006, p. 645)

Model 1 seemed to fit all measures, but following Kelloway's (1996) recommendations for good practice, the model was compared to the above discussed theoretically plausible alternatives. The second model provided far worse fit since its χ^2/df and SRMR value were higher and its CFI was lower. Which highlighted the importance of the mediating states. The third model proved a better fit with the data and was seen as a significant improvement of the hypothesised model (χ^2/df and SRMR were lower, the CFI was slightly higher), inspection of the specific paths suggested a significant direct path between job autonomy and proactive behaviour. The fourth model that was tested in which variables that were included for differential validity purposes were given a substantial role, this model did not improve the fit measures (χ^2/df and SRMR value were lower than the values in the third model, the CFI was slightly lower), indicating that those values that were included for differential purposes were not significantly important for an improvement of the hypothesised model.

Identifying strengths and weaknesses of the model

Now the model proposed by Parker et al has been introduced, it is time to take a step back and discuss the historical strengths and weaknesses of the model. This paragraph will focus on the historical background of measuring the effects of the perceived work environment, and the historical strengths and weaknesses. Using this historical background, a comparison between the model presented by Parker et al and a more commonly used model will identify the strengths and weaknesses of the model presented by Parker et al.

A historical review of work design

This paragraph starts with the early principles of division of labour and scientific management, then briefly explains the concepts of job enrichment and the Job Diagnostic Survey and the concept of socio-technical systems thinking, to end up with an explanation of the interdisciplinary approach. This review will be used in the following paragraph to identify strengths and weaknesses of the model presented by Parker et al (2006).

The beginning: Division of labour and Scientific Management

The first major perspective on work design can be traced back to the work of Smith (1776) and Babbage (1835), "these theorists focussed on the division of labour and how this division of labour could increase worker efficiency and productivity. They noted that breaking up work into discrete jobs enabled specialization and simplification, allowing workers to become highly skilled and efficient at performing particular tasks" (Morgeson & Campion, 2003, p. 425).

This inspired Frederick Taylor (for an interesting introduction on the work of Taylor the reader is referred to Weissbord (2004, pp. 27-74)) to design a system that used the principles found by Smith and Babbage, this system is still known as Scientific Management.
Scientific Management focussed on the principles of division of labour and specialisation. Taylor took these principles and modified them for applicability in practice. He decided to separate the

[3] "a χ2/df-ratio of 2.0 or lower has often been used to indicate good fit (Arbuckle, 1997)" (Morgeson & Humprey, 2006, p.1326).
[4] a SRMR value of 0.08 or lower generally indicates good fit
[5] higher CFI values indicate a better fit

person who controls the job execution (the first line foremen) from the person who designed the job (the expert). Second, Taylor simplified job descriptions in such a way that the jobs were executed in the most ergonomic way, hence not losing precious time on injured workers. Third Taylor decided to provide a wage system that provides an incentive to workers, thereby for the first time providing a 'motivation' for workers who produced significantly more than other workers.

Job enrichment approaches

Job enrichment is defined as: "a technique for broadening the experience of work to enhance employee need satisfaction and to improve work motivation and work performance" (Huczynski & Buchanan, 2007, p. 257). The job enrichment approach reflects the idea that jobs can influence the satisfaction, work motivation, and work performance of an employee.

The work by Frederick Herzberg (1968) drew attention to the fact that work affects employee behaviour in two ways: (a) the work may provide opportunities for intrinsic motivation of the worker, which in turn should result in higher job satisfaction and motivation of the worker; (b) the work has a certain amount of (what Herzberg called) 'hygiene factors' that need to be fulfilled in order for the work to be satisfying, hence not complying to these factors results in not-satisfied employees. Although research generally failed to confirm the relationship between the 'hygiene factors' and no-satisfaction and other aspects of the theory, the theory remains important because it represents an early attempt to understand how the content of work can impact worker motivation, and actually marks the beginnings of the job enrichment approach (Morgeson & Campion, 2003, p. 425).

Although empirical research failed to prove the relationship between no-satisfaction and the 'hygiene factors', the work of Herzberg formed a basis for the research which attempts to identify the job characteristics that are related to individual reactions to work (Morgeson & Campion, 2003, p. 426). This research resulted in the job characteristics model (JCM) by Hackman et al (1975). The JCM was meant to improve performance of workers through job enrichment. One of the appealing features of the JCM is that it takes the growth need strength of an employee into account. Where growth need strength is defined as: "the need for personal accomplishment, for learning and for personal development of an employee" (Hackman et al, 1975, p.60).

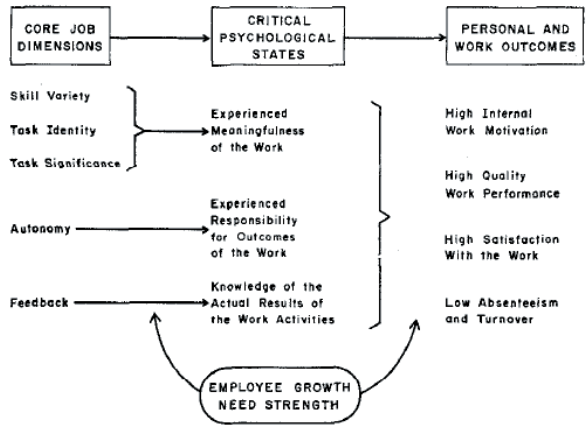

Figure 2: The Job Characteristics Model by Hackman, Oldham, Janson, Purdy (1975, p. 58)

The JCM identifies five core job dimensions: skill variety, task identity, task significance, autonomy and feedback. These five core job dimensions determine three critical psychological states: experienced meaningfulness of the work, experienced responsibility for outcomes of the work,

knowledge of the actual results of the work activities. These three critical states together with the growth need strength of an employee determine the personal and work outcomes, i.e. the amount of internal motivation of an employee, the degree of quality of work performance of an individual, the amount of satisfaction with the work of an individual and the amount of absenteeism and turnover. The resulting Job Diagnostic Survey (JDS) proved difficult to be empirically confirmed due to some reversed scoring issues (Harvey, Billings, & Nilan, 1985; Idaszak & Drasgow, 1987). Despite the empirical difficulties, the JDS remains one of the "most commonly used measures for job design" (Morgeson & Humphrey, 2006, p. 1321).

A second problem that has been identified with the JCM concerns the measurement of the growth need strength. Two of the original measures of growth need strength are influenced by social desirability (Stone, Ganster, Woodman, & Fusilier, 1979). Social desirability may be considered as a style of responding that contaminates or distorts measures of personality. According to this viewpoint a significant correlation between social desirability and the personality measure comprises the integrity of the personality measure (Crant, 1995).

Socio-technical Systems Theory

The socio-technical systems approach arose from work conducted at the Tavistock Institute in the United Kingdom. The Tavistock Institute focused on the use of autonomous groups to accomplish work. The term socio-technical system describes the observation that the interaction of people (a social system) and tools and techniques (technical) result from a choice, and not by chance (Weissbord, 2004, p. 152). The interaction had a reciprocal and dynamic influence on the operation and appropriateness of the technology as well as on the behaviour of people that operate it. Given the interdependence between human and technical systems, socio-technical systems theory suggested that productivity and satisfaction could be maximized via joint optimization, i.e. when the social and technical systems were designed to fit each other (Morgeson & Campion, 2003, p. 426)

Socio-technical design appears to be appropriate when three conditions are satisfied (Cummings, 1978). The first condition is that there must be sufficient task differentiation such that the tasks performed are autonomous and form a self completing whole. The second condition states that employees must have adequate boundary control, so they can influence and control transactions within the task environment, these transactions are e.g. the types of input and output of the production process (Cummings, 1978, p. 628). Finally employees must be able to control the immediate task environment so they can regulate their behaviour and convert raw materials into finished products.

Interdisciplinary model of job design

Recognizing that most job design theory thus far has researched motivational job characteristics, Campion & Thayer (1985) developed the Multimethod Job Design Questionnaire (MJDQ). The MJDQ is meant to research different approaches to job design, i.e. not only the motivational aspects of a job. The MJDQ includes four different approaches to job design: the motivational approach, the mechanistic approach, the biological approach and the perceptual/motor approach. The motivational approach came from the literature on job enrichment and job enlargement, combined with research on job characteristics of motivating jobs. The principles of the mechanistic approach were extracted from classic texts (e.g. Taylor) on Scientific Management and motion studies and encompassed work simplification and specialization. The third approach, the biological approach, is derived from the fields of biological sciences, especially work physiology, biomechanics and anthropometry. The fourth and final approach, perceptual/motor, combines experimental psychology with the information on human engineering and aspects of human factors of ergonomics and skilled performance. The MJDQ suffered from measurement errors and gaps in construct measurement as well , e.g. Edwards, Scully, & Brtek (1999) found that the 4-factor structure proposed by Campion & Thayer was better

conceptualized by capturing 10 factors. Furthermore the MJDQ missed key work characteristics such as autonomy (Edwards et al, 1999). Given the limited nature of past research design a "consideration of moderns forms of work and employment indicates the need to encompass a wider range of work characteristics" (Parker, Wall, & Cordery, 2001, p. 422).

Historical problems in work design

Historically no scientist has succeeded in proposing a model for work design that incorporates different views on elements of work design and maintains measurability. This leads Morgeson & Humprey (2006) to conclude that there is no measure that can capture the middle ground between task and attribute measure, since most measures focus on specific task-oriented measures or attribute-oriented measures (p.1321); and that in the measurement of the perceived work environment ones measurement is largely limited by the range of job characteristics considered, because if one only considers a small number of motivational job characteristics (e.g. autonomy and variety), the types of design decisions are likely to be highly restricted. In contrast, if a more comprehensive set of work characteristics is considered (e.g. autonomy, variety, social support, and physical demands), more fine-grained changes to work can be made (p.1322).These conclusions by Morgeson & Humprey show problems with earlier approaches to measure the perceived work environment.

Morgeson & Humprey (2006, p. 1321) also conclude that "the JDS is still the most commonly used job design measure, (…) which has been problematic since the JDS neglects numerous other work characteristics, and the JDS still has questionable psychometric properties". This remark can be seen as a starting point for a comparative analysis, because, apparently, the JDS has properties that scientists still consider relevant but also provides some opportunities for improvement since the psychometric properties of the JDS are questionable. A comparison between the JDS/JCM and the model by Parker et al seems a worthwhile point of departure to identify relevant strengths and weaknesses, because the model by Parker et al, might be an improvement over the JDS, the most commonly used model to assess the effects of a perceived work environment on the behaviour and attitudes of an employee.

Job Characteristics Model v. Parker et al: strengths and weaknesses

This paragraph will provide a comparison between the model presented by Parker et al and the JCM. This comparison will result in a number of strengths and weaknesses which are summarised in the final part of this paragraph.

When the work of Parker et al (2006) is compared to the JCM by Hackman et al (1975), both models have a number of similarities. For example, both models provide antecedents which can be divided into the two groups used by Parker et al: Individual differences: proactive personality v. growth need strength and the perceived work environment: the three characteristics used by Parker et al v. the core job dimensions by Hackman et al. Two problems that were identified above for these type of measures are: the number of measures included in the analysis of the perceived work environment and the correlation between socially desirable answers and the growth need strength measure.

The first problem: the number of independent criteria that are included in analysing the perceived work environment is a problem for both models (JCM has five criteria and the model by Parker et al has three criteria), because limiting the amount of independent criteria in the measure constrains the types of design decisions that a manager can make when he or she uses this model to design work (Morgeson & Humphrey, 2006). Furthermore one can conclude that only considering three or five criteria for the perceived work environment does not provide a lot of variables that can be used to explain variance in the measures of proactive personality or the mediating states.

The second group of antecedents, the individual differences is measured differently by Hackman et al and Parker et al. Hackman et al identify individual differences as the growth need strength, while Parker et al identify individual differences using a measure for proactive personality. Both measures are suitable to measure individual differences, but serve different goals, i.e. growth need strength relates to the job enrichment outcome in the model by Hackman et al, whilst the proactive personality relates to proactive work behaviour in the model by Parker et al. The second problem for the JCM is still relevant though: a correlation between social desirable answers and the measures of individual differences can still be considered a problem. Fortunately recent research has shown that there is little correlation between the proactive personality measure and social desirability, two examples are provided below:

Crant (1995) discussed the correlation between social desirability and the measure for proactive personality for 131 real estate agents and concluded that the correlation between proactive personality and social desirability was very low (.09) and insignificant. Crant & Bateman (2000) also found little evidence for a significant relation between social desirability and the measure for proactive personality ($r = .02$, $p>.05$) in a paired group survey on the effects of proactive personality on charismatic leadership of managers and bosses (N=156) from a Puerto Rican financial firm. Hence the measure for proactive personality designed by Bateman & Crant (1993), used by Parker et al, can be regarded as not creating the problem of social desirability when it is used. Therefore the proactive personality measure seems to be a feasible alternative to the growth need strength measure used in the JCM, which can be considered a strength of the model presented by Parker et al.

Both models identify a number of mediating states: role breadth self-efficacy, and flexible role orientation v. the critical psychological states. The mediating states used by Parker et al identify a different kind of perceived experience than the states by Hackman et al. Parker et al focus on the judgement of one's capabilities to perform a number of different tasks and the perception on responsibilities that comprise to the role of the individual. Hackman et al focus on the experienced meaningfulness of the work, the experienced responsibility for the outcomes of the work, and the knowledge of actual results of the work activities. The mediating states in the model by Parker et al has been shown to influence the outcomes of the model presented as was hypothesised in relation to personal initiative (Frese & Fay, 2001) or in earlier proactivity research (Parker, 1998;2000). Because the mediating states were shown as relevant predictors of the actual outcome in the model by Parker et al, and in other scientific areas, it can be argued that the use of mediating states in the publication of Parker et al can be considered as a strength. Which is exactly where the model of Parker et al contributes to current literature.

The outcome variables chosen by Parker et al and Hackman et al differ, because the model by Hackman et al focuses on personal and work outcomes, which in turn may result from job enrichment, whilst the model by Parker et al results in proactive work behaviour. However both outcomes can be related to Innovative Work Behaviour. First and most important: both models assume work characteristics as antecedents and work characteristics have been shown to relate to Innovative Work Behaviour (De Jong & Den Hartog, 2010). Second the personal and work outcome: internal work motivation has been shown to relate to Innovative Work Behaviour (Huiskamp, de Jong, & den Hoedt, 2008). Furthermore a proactive attitude of an employee has been shown to relate ($\beta = .20$) to innovative work behaviour (Huiskamp et al, 2008). The other personal and work outcomes that were included in the JCM will not be discussed in this thesis.

The text above has shown some possibilities in which Innovative Work Behaviour and proactive work behaviour relate. Parker et al (2006) even remark that "pressure for innovation increases the need for proactivity." (p.636). Hence both models can be related to Innovative Work Behaviour, which can be considered as a strength of both models.

Strengths and weaknesses of the model by Parker et al

This first chapter was meant to introduce the model by Parker et al and identify its strengths and weaknesses when compared to a relevant historical predecessor. The model presented by Parker et al (2006) shows antecedents of proactive work behaviour, which is a type of behaviour that is self-starting and future oriented. Parker et al argue that these antecedents can be divided into two groups: individual differences and the perceived work environment of an employee. The relation between proactive work behaviour and these antecedents is mediated using two cognitive variables: role breadth self-efficacy and flexible role orientation. For differential validity purposes Parker et al also included one additional mediating state and one additional outcome, but as expected both did not relate to proactive work behaviour. The model presented by Parker et al contributes to current literature because it proposes mediating states between the perceived work environment and individual differences and proactive work behaviour, which is also one of the strengths of the model provided. Another strength can be found in the use of the measure used by Parker et al for individual differences (proactive personality), because the measure used by Parker et al does not correlate with social desirability, while the old Growth Need Strength has been shown to correlate with social desirability. A weakness can be found in the number of characteristics used to measure the perceived work environment. This will be investigated in the next chapter. A second point of attention is the relation between proactive work behaviour and Innovative Work Behaviour, this relation will be discussed in the fourth chapter of this thesis.

The Work Design Questionnaire: a solution!

This chapter will propose a solution for the weakness that has been found in the model regarding the amount of work characteristics considered in the measure of the perceived work environment by Parker et al.

To overcome the problem of having a limited amount of work characteristics when measuring a perceived work environment Morgeson & Humprey (2006) propose the Work Design Questionnaire (WDQ). The WDQ is meant to compare work design of different jobs to each other, based on four dimensions: task characteristics, knowledge characteristics (together with task characteristics knowledge characteristics are identified as motivational characteristics), social characteristics and contextual characteristics; the number of work characteristics that are considered is higher than the amount of items analyzed by both Hackman et al and Parker et al: twenty one. The WDQ will therefore be discussed next.

As mentioned before the WDQ is meant to compare different work designs to each other. Reflecting on the problems with the JDS (e.g. Idaskzak & Drasgow, 1987), Morgeson & Humprey conclude that the JDS remains the most commonly used job design measure (p. 1321). Drawing on the basic principle for the MJDQ Morgeson & Humprey designed the WDQ to reflect the four above mentioned measures of job design. The level of analysis for the WDQ is on the job level. Criteria are shown below in Table 2, the definitions of the criteria can be found in Appendix 1.

Task characteristics	Knowledge characteristics	Social characteristics	Contextual characteristics
Autonomy: Work Scheduling Decision making Work methods	Job complexity	*Interdependence:* Initiated received	Ergonomics
Task variety	Information processing	Social support	Physical demands
Task significance	Problem solving	Interaction outside the organization	Work conditions
Task identity	Skill variety	Feedback from others	Equipment use
Feedback from the job	Specialisation		

Table 2: Overview of criteria from the WDQ

The data that were used by Morgeson & Humprey to validate the questionnaire were structured using the O*NET database, which is an Internet database that provides information and job descriptions of jobs in the United States of America. The data were gained via a series of WDQ-based interviews conducted by junior and senior-level business students, as part of a management course taught by Morgeson & Humprey. Incumbents had at least ten years of experience as full time worker, resulting in a wide range of different jobs (243 to be more precise). The WDQ was validated using Confirmatory Factor Analysis (CFA) on the collected data. A 21-factor structure seemed to be the most appropriate structure for the WDQ; as opposed to an 18 factor-structure (interdependence and autonomy not split), a 19 factor-structure (interdependence split, autonomy not split) and a 20 factor-structure (autonomy split, interdependence not split). Autonomy was identified as a criterion that could be split because of its definition (Morgeson & Humprey, 2006, p. 1323): “autonomy reflects the extent to which a job allows freedom, independence and discretion to schedule work, make decisions, and choose the methods used to perform tasks (…). Thus autonomy includes three

interrelated aspects centred on freedom in (a) work scheduling, (b) decision making, and (c) work methods." Interdependence was defined as (p. 1324): "the degree to which the job depends on others and others depend on it to complete the work (Kiggundu, 1981). As such, interdependence reflects the 'connectedness' of jobs to each other. Integral to this definition are two distinct forms of interdependence (Kiggundu, 1981): (a) the extent to which work flows from one job to other jobs (initiated interdependence) and (b) the extent to which a job is affected by work from other jobs (received interdependence)." This definition was the argument by Morgeson & Humprey for splitting the interdependence-criterion into two separate criteria.

Measures from the CFA are provided in Table 3. Measures that indicated the 21-factor structure as the best solution for the data were: the lowest Standardized Root Mean Square residual (SRMR) measure (.06); the highest Comparative Fit Index (CFI) (.91); and the lowest root-mean-square error of approximation (RMSEA)[1] (.04). Though differences between the 19-factor and the 21-factor models were very small (the CFI of the 19-factor model was 0.01 lower than the CFI of the 21-factor model, the SRMR and RMSEA are the same for the 19 and the 21-factor model), the χ^2/df value for the 21-factor model was lower then the 19-factor model (1.92 for the 21-factor model v. the 1.99 for the 19-factor model), hence making the 21-factor model a better model to represent the data.

Model	χ^2	df	χ^2/df	SRMR	RMSEA [6]	CFI
4-factor	19010	2839	6.70	.12	.11	.40
18-factor	5686	2678	2.12	.06	.05	.89
19-factor	5280	2659	1.99	.06	.04	.90
20-factor	5435	2639	2.06	.06	.05	.90
21-factor	5027	2618	1.92	.06	.04	.91

Table 3: Results of Confirmatory Factor Analyses (Morgeson & Humprey, 2006, p. 1326)

The scales used to measure the different criteria from the WDQ were tested for reliability using three different measures: Internal consistency[7] reliability, interrater reliability (intra class correlation) and interrater agreement. All scales demonstrated excellent internal consistency reliabilities, with an average reliability of 0.87 and only one scale below .70, this was the ergonomics scale. Interrater reliability is used to assess the extent to which incumbents' judgments of their jobs covary with each other relative to incumbents in other jobs (Morgeson & Humprey, 2006, p. 1326) and interrater agreement reflects the level of absolute agreement across raters and thus assesses the extent to which raters make similar mean-level ratings. Generally the scale reliability was confirmed, however the interrater reliability for the scales of: feedback from the job; initiated interdependence; and feedback from others proved too low and insignificant. In contrast to these problems Stegmann et al (2010) found that the scales in a translated version of the WDQ were sufficiently distinct and reliable when the WDQ was given to a group of German nurses. This indicates that future research may need to verify the scale reliability of the above mentioned scales.

Applicability of the WDQ was also tested. using the same O*NET dataset that was mentioned above. The criteria of the WDQ were tested as antecedents of: job satisfaction, compensation requirements and training requirements. Job satisfaction was measured using a 5-item scale (via statements such as "considering everything I am satisfied with my job" $\alpha = 0.86$) and was chosen because it is one of the most common measured outcome variables in the work design area. Training requirements were measured by using the job zone measure from the O*NET database. The job zone measure ranks occupations on the level of experience and training necessary for job success, this measure has been used before in earlier research (e.g. Glomb, Kammeyer-Mueller, & Rotundo, 2004: quoted from

[6] a RMSEA value of 0.05 or lower generally indicates good fit

[7] "reliability coefficients below .70 are generally considered the minimum level for reliability (Morgeson & Humprey, 2006, p. 1326)

Morgeson & Humprey, 2006, p. 1329)). Compensation requirements are measured using a calculated annual salary based on the November 2003 wage data from the U.S. Bureau of Labor Statistics. When more than one respondent held the same job, data were aggregated to the job level The resulting correlations proved to be significant in 65% of all cases, correlations are provided in Appendix 2. Generally the WDQ can be considered as a good measure for the perceived work environment of an employee, because it has sufficient characteristics which can be measured and reliable scales, it has also been shown that measures from the WDQ can be related to outcomes of work design, e.g. job satisfaction. It therefore seems appropriate to include the measures presented in the WDQ in the perceived environment measure in the model by Parker et al (2006).

Why is the Work Design Questionnaire a better alternative for the measure of the perceived work environment?

This chapter presented a solution for the problem of the limited amount of work characteristics in the model by Parker et al (2006). This solution was needed because using a limited amount of work characteristics to measure the perceived work environment doesn't allow for more fine grained analysis, i.e. increasing the amount of criteria in the measure for the perceived work environment results in a greater opportunity for explanation of variances in the outcome variable.

The WDQ was introduced to overcome this problem, because the WDQ allows for investigation of twenty one different work characteristics. Furthermore recent research has shown that the WDQ can be used to relate work characteristics to work outcomes such as motivation, e.g. decision making autonomy. The WDQ represents the interdisciplinary approach to work design, hence it allows for different approaches to work design to provide work characteristics, which in turn is important for explanation of variance found in an empirical test. It therefore seems feasible to include the WDQ as a measure of the perceived work environment in the model presented by Parker et al.

There is however one drawback in using the WDQ as measure of the perceived work environment in the model by Parker et al. Because of the 21-factor structure of the WDQ, the improved model needs a large sample to be reliably tested. One could therefore consider the possibility of using the measures used by Parker et al, even though those measures do not allow for more fine-grained explanation of variance found. This consideration could be overcome by relating all individual measures of the WDQ to role breadth self-efficacy and flexible role orientation. This proof is beyond the scope of this thesis, in stead this thesis will provide one additional argument for using the WDQ when measuring the perceived work environment of an individual in stead of the three criteria used by Parker et al.

Apart from the fact that from the three criteria researched by Parker et al, one criterion doesn't even relate to proactive work behaviour and therefore variance in proactive work behaviour can only be related to the perceived work environment based on two criteria. One of those two criteria is unclear formulated. Job autonomy is not formally defined by Parker et al , their argument for including job autonomy as measure for the perceived work environment is based on the following remark: "job autonomy has been identified as an important determinant of proactive outcomes" (p. 639). This poses a problem because not defining a criterion may result in bad statements in a survey.

This is illustrated in the measure for job autonomy used by Parker et al, because it reflects at least two different types of autonomy from the WDQ: (a) work scheduling autonomy, which is reflected by statements such as: "extent that you help to allocate jobs among team members."; and (b) decision making autonomy that is reflected by statements such as: "extent that you get involved in the selection of new team members.".

What is needed therefore is a properly defined job autonomy criterion, such as the definition used

by Morgeson & Humprey (2006, p. 1323): “the extent a job allows freedom, independence, and discretion to schedule work, make decisions, and choose the methods used to perform tasks”. This statement can be used to identify three different criteria with appropriate measures, as is done in the WDQ.

It can be argued that the measures used by Parker et al are context specific measures, since her sample was one with workers that worked in teams. However this doesn’t change the point made about the measures used by Parker et al in the survey for job autonomy, the measures still don’t reflect a common definition.

Individual proactive work behaviour & Innovative work behaviour

A second issue for the model of Parker et al that needs solving, is the relation with IWB. This needs to be done since relating proactivity to innovation is an essential step for achieving the goal of this thesis. Hence the next step in this thesis is to identify a relevant relation between the model for proactive work behaviour and innovation. Fortunately Parker et al provide one: "pressure for innovation leads to need for proactivity" (p. 636). This statement is not proven by Parker et al. It is therefore wise to clarify the reasoning behind this statement before presenting the new model of the antecedents of Innovative Work Behaviour. This chapter will provide an analysis of the differences between innovation and proactivity and will clarify the reasoning behind the statement given above by Parker et al.

Innovation

Innovation refers to "the production, adoption and implementation of useful ideas, including the adaptation of products or processes from outside an organization" (Crant, 2000, p. 450). Kanter, (1988), Scott & Bruce (1994), Crant (2000), and Unsworth & Parker (2003) all define innovation as a behavioural process, therefore the definition for innovation that will be used in this thesis is the same as the one used by Unsworth & Parker (2003, p. 180), who emphasise the process and behavioural side of innovation: "Innovation is the process of *engaging* in behaviours designed to generate and implement new ideas, processes, products and services, regardless of the ultimate success of the phenomena". This definition implies that a person has to engage in behaviours that results in generation or implementation of processes, products and services, hence making these types of behaviours self starting, i.e. a person has to engage in an activity by himself/herself regardless of the outcome.

The behaviours referred to in the definition of innovation tend to describe Innovative Work Behaviour. Innovative Work Behaviour (IWB) is defined as: "an individual's behaviour that aims to achieve the initiation and intentional introduction (within a work role, group or organization) of new and useful ideas, processes, products or procedures." (Farr & Ford, 1990).

IWB differs from employee creativity (which is defined as: "the production of new and useful ideas concerning products, services, processes and procedures" (Amabile T. , 1988)), since creativity can be seen as a starting point for innovation (Amabile, Conti, Coon, Lazenby, & Herron, 1996) (Amabile, Conti, Coon, Lazenby, & Herron, 1996) and because IWB also includes the implementation of those ideas (De Jong & Den Hartog, 2010).

As mentioned before IWB can be seen as a behavioural process (Unsworth & Parker, 2003; Janssen, 2000; Scott & Bruce, 1994), it is therefore useful to discuss this process subsequently. "Innovative work behaviour begins with problem recognition and the generation of novel or adopted ideas or solutions. Next, the innovative employee seeks sponsorship for the idea and attempts to build a coalition of supporters for it. Finally these activities result in some prototype or model of the innovation that can be used by the organization "(Crant, 2000; Kanter, 1988). The IWB model can be divided into two separate parts. A part that is known as the creativity oriented part of the process, and a part that is more implementation oriented. The creativity oriented part consists of the problem identification and idea generation phases, two aspects well researched in creativity research (e.g. Amabile, 1998). The implementation oriented part of the IWB model includes the stages that focus on the actual idea promotion (championing) with supervisors and other constituents and idea realisation, i.e. actually producing a prototype and evaluating its performance. The IWB process is depicted in Figure 3.

Figure 3: Innovative work behaviour explained (Doorenbosch, van Engen, & Verhagen, 2005)

Keeping the goal of this thesis in mind it is relevant to consider what previous literature identifies as antecedents of IWB. Antecedents of IWB are discussed in the literature as a result of the perceived work environment, directly (e.g. Amabile et al, 1996) or mediated via another variable, such as role breadth self-efficacy (Parker et al, 2006; Parker, 1998) or product ownership (Doorenbosch et al, 2005). Other authors successfully relate IWB to an innovative outcome, e.g. via voicing ideas (De Jong & Den Hartog, 2010), however measurement of this innovative outcome seems to concentrate on self starting behaviours or actions, which is illustrated in the following measure by De Jong & Den Hartog (2010, p. 35): "In your job, how often do you make suggestions to improve current products or services?". It therefore seems apparent that IWB can be seen as something that needs to be started using self starting behaviour, in which it overlaps with the definition of proactivity, which will be discussed below. Furthermore the model of Parker et al (2006) does not include IWB itself, the publication only remarks that pressure for innovation can increase the need for proactivity (p. 636).

Proactivity

The above analysis implies a relation between IWB and proactive work behaviour, that defines proactive work behaviour as an antecedent of IWB. Crant (2000) remarks that there is a certain relationship between proactive behaviour and IWB. However before elaborating on this relation it is necessary to define proactivity and proactive work behaviour.

Proactivity is defined as: "a self-starting, action-oriented behaviour that is aimed at modifying the situation or oneself to achieve greater personal or organizational effectiveness" (Unsworth & Parker, 2003, p. 178). Proactive work behaviour is defined in accordance to the definition provided by Crant (2000, p. 436): "proactive behaviour is taking initiative in improving current circumstances or creating new ones; it involves challenging the status quo rather than passively adapting to present conditions.", hence proactive work behaviour can be seen as the term for a collection of self starting behavioural processes. These process can be operationalised as was done by Parker et al (2006) as: proactive idea implementation and proactive problem solving, but also in other ways such as demonstrated further below. Self starting behaviour "implies that a person does something without being told, without getting an explicit instruction, or without an explicit role requirement" (Frese & Fay, 2001, p. 139). By definition proactive work behaviour is self starting behaviour and can therefore result in an innovative outcome, e.g. by voicing ideas (Parker, et al, 2006, p.637).

Relation between proactivity and innovation

In the previous two paragraphs the definitions of both innovation and proactivity were discussed. The next step for this chapter is to highlight the relation between proactivity and innovation or, more precisely, the relation between proactive work behaviour and IWB. Unsworth & Parker (2003) discuss the relation between proactivity and innovation, they conclude that the definitions of both innovation and proactivity are concentrated around self starting types of behaviour with different orientations. Innovation is meant to generate and implement new ideas, whilst proactivity is designed to describe behaviours that are self starting, action-oriented, meant to change one's environment or oneself. In the discussion of IWB it became clear that the measure of the IWB concentrates partly

on self starting (engaging in) behaviours, e.g. in the idea generation phase of IWB. Furthermore the remark by Parker et al regarding the increase in need for proactivity as a consequence of pressure for innovation also strengthens a hypothesised relation between proactive work behaviour and IWB. Both statements will be discussed next.

Relating self starting behaviours to IWB is therefore relatively easy, because until after the championing phase an employee has to take initiative him- or herself, after the championing phase sufficient support should be gained to continue as part of the work. During the first phase, (proactive) problem identification, self starting behaviour is needed for problem identification, because searching with a long term orientation for problems has often been characterised as extra-role behaviour (Parker et al, 2006, p 637) and requires challenging the status quo (Crant, 2000). During the second phase (idea generation) self starting behaviour is again important since the challenge of the status quo requires personal initiative/self starting behaviour (Crant, 2000). During the third phase (championing) a person has to gain support for his or her innovation, even though some persons might already be convinced of the usefulness of the innovation this phase is meant to create support for the innovation and find funding for prototyping the innovation (De Jong & Den Hartog, 2010). This involves the employee being persistent and getting the right people involved. This is again a situation in which the innovative employee needs self starting behaviour, e.g. to identify key persons. During the fourth phase sufficient support has been gained, which decreases the need for self starting behaviour.

Parker et al (2006) argue that pressure for innovation increases the need for proactivity. This implies that to be more innovative, employees need to be proactive, why else would pressure for innovation result in an increase in the need for proactivity? It is therefore hypothesised that proactivity is needed as a starting point in the IWB process and henceforth it can be hypothesised that the antecedents of proactive work behaviour are the same antecedents that have to be considered when researching IWB.

Now that this relation has been hypothesised it is arguable that the model by Parker et al, which shows the antecedents of proactive work behaviour can also be used to show the antecedents of Innovative Work Behaviour, hence the term proactive work behaviour can be replaced by IWB.

Substituting Innovative Work Behaviour in the model by Parker et al

This chapter was meant to identify the relation between proactivity and innovation. It was argued that proactivity is a set of self-starting behaviours, with proactive work behaviour as behavioural outcome of proactivity. Innovation was referred to as the production, adoption and implementation of useful ideas, including the adaptation of products or processes from outside an organization, and was defined as the process of *engagement* in behaviours that result in the generation and implementation of new ideas. IWB was defined as: an individual's behaviour that aims to achieve the initiation and intentional introduction of new and useful ideas, processes, products or procedures. It was hypothesised that proactive work behaviour can be replaced by IWB, partly because of the remark by Parker et al regarding the increase in the need for proactivity due to pressure for innovation implies that an increase in proactive behaviour results in an increase of innovative work behaviour, and partly because the definition of proactive work behaviour and IWB imply self starting behaviour. It is subsequently argued that the model presented by Parker et al can be used to present antecedents of IWB as well.

The antecedents of Innovative Work Behaviour

This chapter will present the model that represents the antecedents of IWB. The newly proposed model of antecedents for IWB will be introduced and explained, explanation is based on the earlier findings of this research.

Towards a new model for Innovative Work Behaviour

The new model, presented in Figure 4 below, presents the antecedents of IWB and is based on the model of antecedents for proactive work behaviour presented by Parker et al, it draws on the model by Parker et al by using the same underlying principles to reflect the antecedents of proactive work behaviour: it also assumes individual differences and the perceived work environment as mediated antecedents of proactive work behaviour; however it substitutes proactive work behaviour for IWB. The model will be discussed next from, starting with individual differences and ending with IWB.

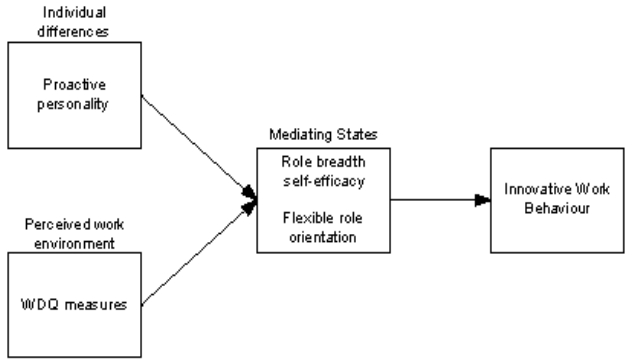

Figure 4: Modelling the antecedents of Innovative Work Behaviour

Individual differences are the same individual differences as those that were used in the model presented by Parker et al, measurement can be done using the same four statements with the highest loading factors from the self assessment survey questions of the Bateman & Crant (1993) measure of proactive personality. Different analyses have shown that the measure is reliable and does not correlate significantly nor sufficiently with social desirability measures. Future research is advised to test their research results for correlation between the measure for individual differences and social desirability, because testing in a new context may yield different results when it comes to the above mentioned correlation.

The perceived work environment in the model presented by Parker et al lacked the opportunity for fine grained changes to measures of the perceived work environment, furthermore using more criteria in the perceived work environment measure allows for better identification of the effects of changes in the perceived work environment that relate to changes in role breadth self-efficacy or role orientation and to changes in proactive work behaviour or changes in IWB. The WDQ provides ample opportunity for such modifications. Measurement can be done using the statements and scales provided by Morgeson & Humprey (2006), empirical evidence on the relevance of all factors from the WDQ should be gathered in subsequent studies, because validation is beyond the scope of this thesis.

The mediating states that are considered in Figure 4 are assumed to be the same as the mediators that mediate the relation between the perceived work environment and individual differences with proactive behaviour. This was assumed because, it was hypothesised that the antecedents of proactive work behaviour are the same antecedents as the antecedents of IWB. Empirical testing again needs to confirm this assumption. Theoretical arguments however indicate that IWB can have a mediated relation with its antecedents, e.g. via product ownership (Doorenbosch et al, 2005).

Proactive work behaviour was identified by Parker et al as proactive problem solving and proactive idea implementation, however the definition of proactivity implies that proactive work behaviour is a label for a collection of different types of self starting behaviour. As shown in the previous chapter, IWB is a form of proactive work behaviour and thus proactive work behaviour can be substituted by IWB. Measurement of IWB does pose some problems, because theoretical arguments propose a four dimension structure that in total describes IWB, measurement of IWB indicates a 1-dimension structure (Scott & Bruce, 1994; Janssen, 2000; De Jong & Den Hartog, 2010). De Jong & Den Hartog (2010) explain this difference by suggesting that the four dimensions, that reflect the different processes in IWB, were related and hence combine into one dimension, because evidence of the distinctiveness of the four dimensions is weak, and theoretical argumentation allows for individuals to be involved in any combination of these behaviours at any time (Scott & Bruce, 1994). In line with the suggestion by De Jong & Den Hartog (p. 34) the measure of IWB by De Jong & Den Hartog (2010) can be given to close observers of focal employee's IWB, which might decrease intercorrelation between the dimensions of IWB.

Discussion & consequences

This chapter will compare the newly presented model to other models that provide antecedents of IWB. It will also discuss the consequences for both scientists and managers.

Discussion

This discussion will start with outlining the most important historical model, the antecedents of this model will not be compared to the newly proposed model of IWB, because the first stage in the model comprises two types of behaviour that rely on distinct cognitive abilities. This historical model is discussed because it provides another reason why the new model of antecedents of IWB is that important. Antecedents of a better model of IWB, as presented in Figure 3, will be discussed and compared to the model presented in this thesis.

IWB research has started in 1994 with the work of Scott & Bruce. Scott and Bruce tried to integrate different streams of research on the antecedents of innovation to develop and test a model of individual innovative behaviour (r^2 = .37). The model identified by Scott & Bruce (1994) consists of three stages: idea generation, coalition building and idea implementation. During the first stage an individual generates an idea for a new innovation sometimes based on problem identification. In the second stage an individual seeks sponsorship for his/her idea and through coalition building he/she tries to gain support for it. During the third stage an individual contributes in the process of implementation of the new innovation, for example he or she might produce an actual prototype of the innovation, or by contributing to the execution of the new idea in other ways. The first stage is defined rather broad, as it includes both problem recognition and idea generation, both of which have been shown to rely on distinct cognitive abilities (De Jong & Den Hartog, 2010). This has lead to the more common approach to IWB as presented in Figure 3 that separates problem identification and idea generation.

This four stage process, however, is were current IWB literature stands. Most attention is given to the process of IWB and not as much to its antecedents. Paying attention to those antecedents is however really important because knowledge of antecedents of IWB has important managerial implications, those implications will be discussed in the next paragraph.

A notable exception to the lack of attention for antecedents of IWB can be found in the work of De Jong & Den Hartog (2010) as they find that participative leadership (r = .25) and external work contacts (r = .27) can be seen as potential antecedents of IWB. Participative leadership is defined as a type of leadership that involves the use of decision-making procedures that allow subordinates influence in important decisions and autonomy to design and guide their own tasks. De Jong and Den Hartog argue that participative leadership enhances IWB because participative leadership increases intrinsic motivation and in turn intrinsic motivation enhances IWB. Intrinsic motivation can be compared to the 'motivators' identified by Herzberg as described above. De Jong and Den Hartog define external work contacts as: "the frequency of employees' contacts with individuals or groups outside the organization who may form a relevant source of information, inspiration or innovation resources." (pp. 25,27). According to De Jong and Den Hartog external work contacts relate to IWB because employees with such contacts are exposed to diverse views and ideas that may help spark their creativity.

The antecedents of IWB that were found by De Jong and Den Hartog are in line with this thesis, since the definitions of the antecedents used by De Jong and Den Hartog are comparable to the definitions used in the WDQ. Participative leadership may refer to decision-making and work methods autonomy ("the extent to which a job allows freedom, independence and discretion to make decisions and choose the methods used to perform tasks"). The second antecedent, external work contacts, has a similar definition like the definition for the interaction outside the organization criterion from

the WDQ, that definition was: “the extent to which the job requires employees to interact and communicate with individuals external to the organisation”.

A second notable example that identifies a number of antecedents of IWB is the work of Huiskamp et al (2008), their model has been discussed briefly in the introduction of this thesis. At this point it will be discussed again in some more detail. Huiskamp et al argue that IWB is affected by four different groups of factors, these are: HRM motivational practices, HRM scope offering practices, social network factors, and individual differences. These four groups reflect different groups of the antecedents in the newly presented model of antecedents of IWB.

The task and knowledge characteristics used in the WDQ can be compared to the HRM practices antecedents used by Huiskamp et al, while the social network construct used by Huiskamp et al can be compared to the social characteristics construct from the WDQ. Finally the individual differences construct can also be found in the model of antecedents of IWB presented in this thesis. This means that the different groups of antecedents identified by Huiskamp et al, are mostly reflected in the measures of antecedents of IWB proposed in this thesis.

However, a more thorough analysis is needed to compare the different sets of criteria used in the newly presented model and the model presented by Huiskamp et al.

The first group consists of HRM practices that offer motivation to the individual. This group was chosen because, as Huiskamp et al argue, only if the job of an employee challenges him or her in the right way, he or she will be motivated to produce better results and accept more difficult tasks. The first group consists of three criteria: the amount of challenge in a job, the offering of an extra (financial) reward for additional efforts, and the practice of transformational leadership. Huiskamp et al argue that an increase in the number of challenges in a job, increases the amount of ideas an employee needs to generate this in turn provides an incentive to work better (and more innovative). The same is argued by Huiskamp et al for the use of incentive financial rewards for extra efforts: the possibility of an extra reward provides an individual incentive to conduct IWB. The third criterion, the practice of transformational leadership, is defined as: “a leadership style that stimulates the development of talents and the ability of independent thinking ability of others” (Huiskamp et al, 2008, p. 58). Huiskamp et al argue that an increase in transformational leadership provides an increase in IWB. They however don’t provide a theoretical argument for their hypothesis.

The first criterion, amount of challenges in a job, can be compared to the combination of the task variety criterion and the job complexity criterion used in the WDQ. Task variety was defined as: “the degree to which a job requires employees to perform a wide rang of tasks on the job” and job complexity was defined as: “the extent to which the tasks on a job are complex and difficult to perform”. The third criterion used by Huiskamp et al, practice of transformational leadership, overlaps with the definition of feedback from others used in the WDQ. Feedback from others is defined as: “the degree to which others in the organization provide information about performance”, and this information is needed to improve one’s talents and abilities. The second criterion is not reflected in the current model, this however does not mean that the criterion needs to be included because an incentive (financial) reward has not been shown to relate to an increase in IWB or innovative output. Incorporation of this measure proposed above in this thesis is far from certain, because measurement of the importance of a (financial) incentive reward was done by Huiskamp et al using a self-assessment, and self-assessment of the effects of financial rewards on output of an employee has been shown to bias research results (Reynes, Gerhart, & Minette, 2004).

HRM practices that offer scope are those practices that offer limitations for conducting IWB, these limitations are constructed using three different types of limitation: the amount of formalisation, the possibilities for custom employment agreements regarding working times, and the amount of autonomy an employee has. According to Huiskamp et al the relation between this approach and IWB

is the same as the relation between organisational empowerment and IWB identified by Spreitzer (2007).

Formalisation is defined by Huiskamp et al as: “the extent to which rules, procedures, instructions and communications are written down and formalised”. Huiskamp et al argue that an increase in formalisation decreases the amount of IWB used by employees, because formalisation restricts the amount of possibilities to react on new situations. This approach is reflected in the WDQ, however as a complement of two groups of variables: the first group consists of only one variable: skill variety, which is defined as: “the extent to which a job requires an individual to use a variety of different skills to complete the work”. The second group consists of the three types of autonomy mentioned earlier in this thesis.

The second variable: the possibility for custom employment agreements is expected to be positively related to IWB, meaning that the more possibilities for custom agreements the more IWB an individual has. Huiskamp et al argue that an increased possibility for custom agreements increases worker motivation and hence worker IWB. This relation was confirmed by Huiskamp et al ($\beta = .11$), but is not taken into consideration in the model of antecedents for IWB presented in this thesis. This criterion was not taken into consideration up to this point in time because the measures used by both Morgeson & Humprey and Parker et al, don’t reflect the effects of task description on worker motivation. Future research should concentrate on this issue, i.e. the question whether to incorporate a measure for the effects of these custom agreements, since an investigation of this concept is out of the scope and time available in this thesis.

The third variable, the amount of autonomy an employee has, is defined as: “the possibilities an employee has to determine work methods and work scheduling themselves.”. This third variable is theoretically related to IWB because, as Huiskamp et al argue, an increase in autonomy could lead to an increase in available time to create new ideas or identify new problems. Unfortunately the research by Huiskamp et al failed to confirm this relation. Since the measure for autonomy consisted of just one criterion a more fine grained group of criteria might explain more variance and provide a possibility to confirm autonomy as a relevant antecedent of IWB. This group might consist of the three types of autonomy used in the WDQ, since the work scheduling autonomy and the work methods autonomy criteria are combined in the measure used by Huiskamp et al.

The third group of criteria that relate to IWB according to Huiskamp et al consists of social network characteristics. This group of criteria concentrates on two different types of social networking: trust and cooperation. Huiskamp et al argue that trust is an important precondition because trust in both colleagues and leaders increases the amount of self-efficacy of a person and hence the amount of IWB. Cooperation with others within and outside an organisation results in IWB because, according to Huiskamp et al, this cooperation provides the opportunity for workers to experience new ideas. From the social network criteria only the cooperation with workers outside the own organisation was significantly proven to be related to IWB, this criterion is also included in the WDQ.

Finally the fourth group, individual differences, were measured using a measure for the proactive attitude of an employee and the amount of confidence an employee has. This first variable has been discussed in this thesis, as being substitutable for IWB itself and will therefore not be taken into consideration in this paragraph.

The second variable is also included in the new model, however as a mediating state, and for a good reason. It is true that confidence is an important variable for IWB. However the antecedents used in the new model have been proven to be mediated by self-efficacy which makes considering confidence as described by Huiskamp et al unnecessary.

Consequences

Naturally, comparing the presented model to two other models does not give the author any right to claim that the model is the new model for the antecedents of IWB. However, it does become clear that the model presented in this thesis describes criteria that have been studied before and have been shown to relate to IWB. Therefore one can say that based on previous research the new model provides a more comprehensive basis for determining the antecedents of IWB than previous research did. The next step therefore is to look at some consequences of the model of antecedents of IWB.

Scientific consequences

As shown before, the study of IWB has only recently been started, i.e. in 1994. Most attention has been given to identifying the different stages of IWB, this research has lead most researchers to agree that the process of IWB consists of four separate dimensions. Scientific attention is therefore turning to question of how to measure these four dimensions in a way that there distinctiveness can be found. However, in this shift of attention, one important aspect of IWB may be given too few attention. Because researching ways to measure this process, is actually asking why does this process occur? In other words, what factors can be considered antecedents of problem identification, idea generation, championing and idea realisation?

Some scientists (e.g. De Jong & Den Hartog, 2010; Huiskamp et al, 2008) lead the way in searching for antecedents of IWB. However more explorative study, and especially empirical research, is needed to confirm that the factors from the WDQ represent the factors needed to describe the perceived working environment of an individual.

A second scientific consequence of the model presented in this thesis is that work design research might need to shift its attention to include both the perceived work environment and individual differences. This means that most research, that has been conducted with the job level as the level of analysis, needs to be expanded using psychological theory to include individual differences among employees. Because, as has been shown in this thesis, the individual has an important part in work design research, and these individual differences have been neglected by work design research (e.g. Campion & Thayer, 1985; Campion, 1988).

One important limitation of the model presented in this thesis is that empirical validation will be a time consuming and costly process since the model presented includes a total of twenty-eight criteria with at least three different statements per criteria. It might therefore be recommendable to identify theoretical relations between all variables presented in the WDQ, and the mediating states and IWB, and dismiss or add any variables that don't have theoretical value. The second step will be to test each of these relations individually using CFA, this can be done using smaller subsamples. Hence removing all unnecessary criteria or add relevant criteria from other studies. The third step will be to test the model empirically using a larger sample and CFA.

Managerial consequences

The model presented in this thesis has some managerial consequences as well. These consequences will be discussed next.

The first and most obvious consequence for managers is that the job is not the only important antecedent of employee innovativion, but there is more. This thesis argues that personality *and* the perceived work environment together with role breadth self-efficacy and role orientation are all important to consider when a manager wants his or her employees to be innovative. This means that if a manager wants employees to create more innovative output he or she should consider if both the work environment is generally stimulating IWB and if the employee has the correct personality, amount of self-efficacy and role orientation to conduct IWB. This might mean, for example, that

employees should be given more autonomy about the choice of work methods, because that might increase their confidence and in turn result in IWB.

Another consequence for management lies in recruitment. If a manager wants a person who he or she thinks may need to render innovative output, the person needs to have a proactive personality and the right attitude towards his or her own task description. The other way around is also possible. If a manager needs a person who just needs to do repetitive work without question, the same measure might be used to find persons without a proactive personality that might be more suitable for such jobs, since workers with a proactive personality mostly challenge the status quo in their job in stead of just complying to their task description.

The previous consequence leads to the main managerial consequence regarding this model, which provides a matter of choice for the manager. This statement needs some explanation. Since employees that conduct IWB constantly challenge the status quo and suggest new ideas, these employees might not be as efficient in the short term as they might be in the long term. It is therefore a choice by the manager if and how many employees with IWB the manager wants. This thesis concludes the discussion of the managerial consequences with the remark that a manager has to make a choice. Because the manager has to decide whether and if so how many employees with IWB the company needs, this decision probably depends on the orientation towards the long or short term of the manager.

Conclusion

This thesis has provided an answer to the question regarding the theoretic relation between the antecedents of proactive work behaviour and proactive work behaviour, which was:

"Which variables should be added to relate job and personality characteristics to innovative work behaviour and to improve the model presented by Parker et al (2006)*?"*

This thesis has answered this question in a number of steps. The first step was to discuss the model presented by Parker et al (2006).

Parker et al (2006) argue that the antecedents of individual proactive work behaviour (which is defined as a collection of self-starting, future oriented behaviours) can be modelled with a number of mediating states that reflect the role orientation and self-efficacy of a person. Parker et al divide the antecedents of proactive work behaviour into two separate groups: individual differences and the perceived work environment of an individual. Individual differences reflect differences between individual employees, while the perceived work environment describes how the work environment is perceived by the individual employee. Measures for these groups were: a proactive personality for individual differences and the amount of autonomy of a worker, together with co-worker trust for the perceived work environment of an employee.

Using a comparative analysis of the model presented by Parker et al with the most common used historical model (the Job Characteristics Model), the amount of criteria used for measuring the perceived work environment of an individual was identified as a weakness of the model proposed by Parker et al. Because a limited amount of criteria in the measure for the perceived work environment, creates less opportunities for more fine grained modifications to work design, i.e. increasing the number of criteria should increase r^2 of the model[8]. The measure for individual differences was identified as a strength of the model proposed by Parker et al, because it correlated insignificantly to social desirability.

The third step was to increase the amount of criteria that could be used to measure the perceived work environment. This was done using the Work Design Questionnaire by Morgeson & Humprey (2006). These WDQ criteria increased the total number of criteria used to measure the perceived work environment from two to twenty-one. Further research is needed to relate all the WDQ criteria to the mediating states in the model, since this is out of the time and scope of this research. A comparison with earlier research on IWB has shown that the WDQ criteria have already been used successfully as antecedents of IWB, no scholar has put these criteria together into one model.

The fourth step in this thesis was to identify a relation between proactive behaviour and IWB, because the research goal was to provide an improved model on the relation between job and personality characteristics and innovative work behaviour, based on the model presented by Parker, et al (2006). To identify a relation between proactive work behaviour and IWB this thesis started with defining innovation. Innovation was defined as the process of engaging in behaviours designed to generate and implement new ideas. Innovative Work Behaviour was accordingly defined as: an individual's behaviour that aims to achieve the initiation and intentional introduction of new and useful ideas, processes, products or procedures. IWB was shown as a four stage process that included problem identification, idea generation, championing, and idea realisation, more important IWB was seen as a behaviour and hence self-starting. The next step was to define proactivity, proactivity was roughly defined as types of behaviours that are both self-starting and future oriented. As a consequence of this definition proactive work behaviour was defined as taking initiative to improve

[8] It is not argued that an increase in criteria used in a model to explain variance results in a linear increase in r^2, only that increasing the number of criteria is likely to increase r^2 when few criteria are considered. Factor analysis will be needed to confirm if adding criteria increases r^2 sufficiently.

current circumstances, or challenge a status quo. providing the definition of proactivity, which reflected proactivity as types of behaviour that are both self-starting and future oriented. Proactive work behaviour was seen as behaviours that are both self-starting and future oriented. IWB was defined as a four stage process that included problem identification, idea generation, championing, and idea realisation, more important IWB was seen as a behaviour and hence self-starting. These definition, together with the remark by Parker et al on the fact that pressure for innovation increases the need for proactivity, lead to the conclusion that IWB is in fact no more than just another form of proactive work behaviour and could therefore be substituted for proactive work behaviour in the improved model of Parker et al.

The fifth step presented the new model for the antecedents of IWB, as depicted in Figure 4. This model does have some limitations, for example its underpinnings are purely theoretical, hence empirical testing is needed to confirm these theoretical relations. A second limitation is that the theoretical relation between the mediating states and each of the individual WDQ measures has not explicitly been identified, meaning that future research should concentrate on testing the relations between the WDQ measures and the mediating states before testing the entire model. Managerial consequences of the newly presented model involve a possibility for managers to select and support innovative employees.

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Appendix 1

Definitions of attributes used in the Work Design Questionnaire (Morgeson & Humphrey, 2006)

Task characteristics:

1-3 **Work Scheduling, Decision-making, Work methods autonomy:** the extent to which a job allows freedom, independence and discretion to schedule work, make decisions and choose the methods used to perform tasks.
4. **Task variety:** the degree to which a job requires employees to perform a wide range of tasks on the job.
5. **Task significance:** the degree to which a job influences the lives or work of others, whether inside or outside the organization. (Hackman & Oldham, 1975)
6. **Task identity:** The degree to which a job involves a whole piece of work, the results of which can be easily identified (Sims et al., 1976)
7. **Feedback from job:** the degree to which the job provides direct and clear information about the effectiveness of task performance (Hackman & Oldham, 1976)

Knowledge characteristics:

8. **Job complexity:** the extent to which the tasks on a job are complex and difficult to perform
9. **Information processing:** the degree to which a job requires attending to and processing data or other information
10. **Problem solving:** the degree to which a job requires unique ideas or solutions and reflects the more active, cognitive processing requirements of a job (Jackson, Wall, Martin & Davids, 1993; Wall et al.,1995)
11. **Skill variety:** the extent to which a job requires an individual to use a variety of different skills to complete the work (Hackman & Oldham, 1980)
12. **Specialization:** the extent to which a job involves performing specialized tasks or possessing specialized knowledge and skill.

Social characteristics:

13. **Social support:** the degree to which a job provides opportunities for advice and assistance from others.
14. **Initiated interdependence:** the extent to which work flows from one job to other jobs
15. **Received interdependence:** the extent to which a job is affected by work from other jobs
16. **Interaction outside the organization:** the extent to which the job requires employees to interact and communicate with individuals external to the organization
17. **Feedback from others:** the degree to which others in the organization provide information about performance.

Contextual characteristics:

18. **Ergonomics:** the degree to which a job allows correct or appropriate posture and movement
19. **Physical demands:** the level of physical activity or effort required in the job
20. **Work conditions:** the environment within which a job is performed, it includes the presence of health hazards and noise, temperature, and cleanliness of the working environment.
21. **Equipment use:** the variety and complexity of the technology and equipment used in a job.

Appendix 2

Correlations provided in publications

Independent\ Dependent variable	Role breadth self-efficacy	Control appraisals	Change orientation	Flexible role orientation	Affective organizational commitment
Proactive personality	.49 (p<.01)	.07 (p>.05)	.17 (p<.01)	.29 (p<.01)	.23 (p<.01)
Job autonomy	.42 (p<.01)	.22 (p<.01)	.24 (p<.01)	.26 (p<.01)	.16 (p<.05)
Co-worker trust	.16 (p<.01)	.27 (p<.01)	.22 (p<.01)	.33 (p<.01)	.36 (p<.01)
Supportive supervision	.17 (p<.01)	.27 (p<.01)	.29 (p<.01)	.24 (p<.01)	.32 (p<.01)

Table 4: Intercorrelations for the model proposed by Parker et al, relations between independent and mediating variables

Independent (or mediating)\ dependent variable	Proactive work behavior	Generalized compliance
Job autonomy	.38 (p<.01)	
Role breadth self efficacy	.37 (p<.01)	.13 (p<.05)
Flexible role orientation	.33 (p<.01)	.26 (p<.01)

Table 5: Intercorrelations for the model proposed by Parker et al, relations between mediating and dependent variables

Appendix 2 (continued)

Independent\Dependent variable	Satisfaction	Training requirements	Compensation requirements
Work scheduling autonomy	.47 (p<.01)	**.12 (p>.05)**	.16 (p<.05)
Decision making autonomy	.53 (p<.01)	.18 (p<.05)	.27 (p<.01)
Work methods autonomy	.44 (p<.01)	**.12 (p>.05)**	.20 (p<.01)
Task variety	.23 (p<.01)	**.11 (p>.05)**	**.13 (p>.05)**
Significance	.33 (p<.01)	.16 (p<.05)	.23 (p<.01)
Task Identity	.13 (p<.05)	**-.05 (p>.05)**	**-.07 (p>.05)**
Feedback from job	.22 (p<.01)	**.04 (p>.05)**	**.05 (p>.05)**
Job complexity	.23 (p<.01)	.39 (p<.01)	.37 (p<.01)
Information processing	.38 (p<.01)	.33 (p<.01)	.37 (p<.01)
Problem solving	.28 (p<.01)	.30 (p<.01)	.21 (p<.01)
Skill variety	.45 (p<.01)	.34 (p<.01)	.37 (p<.01)
Specialization	.35 (p<.01)	.28 (p<.01)	.26 (p<.01)
Social support	.43 (p<.01)	**-.09 (p>.05)**	**-.10 (p>.05)**
Initiated interdependence	**-.09 (p>.05)**	**-.05 (p>.05)**	**.05 (p>.05)**
Received interdependence	**-.02 (p>.05)**	**-.02 (p>.05)**	**.10 (p>.05)**
Interaction outside organization	.24 (p<.01)	.03 (p>.05)	.17 (p<.05)
Feedback from others	**.08 (p>.05)**	**-.09 (p>.05)**	**-.10 (p>.05)**
Ergonomics	.29 (p<.01)	.19 (p<.01)	.27 (p<.01)
Physical demands	-.05 (p>.05)	-.20 (p<.01)	-.27 (p<.01)
Work conditions	.20 (p<.01)	.23 (p<.01)	.32 (p<.01)
Equipment use	**.12 (p>.05)**	**.06 (p>.05)**	**.05 (p>.05)**

Table 6: Correlations when the WDQ was tested as antecedent measure for job satisfaction, compensation requirements and training requirements.

The above table shows that 22 of the 63 correlations where insignificant , hence the WDQ criteria correlated to the expected outcomes in 65% of all cases.

Appendix 3

Reflection on writing my BSc assignment, Sean Straatman (s0141305)

Each Bachelor assignment has to include a reflection on the professional functioning of the student by the student him or herself. This reflection will present my opinion on the process of writing and learning how to write this thesis.

The process started in November 2009, as said in the acknowledgements section of this thesis. Around that time I decided that I wanted to learn how to do scientific research, and if possible I wanted to experience scientific research in practice. Full of my initial enthusiasm I decided to ask Maarten (van Riemsdijk) to help me in learning this skill. The reason I chose Maarten at that point in time, was that I had worked with Maarten before: he was my teacher for the course 'Interne Organisatie', and he was my colleague when I was student assistant for that same course, one year later.

I went to Maarten with a story that had troubled me for a couple of years. The story is illustrative for what drove me to write this thesis, so I'll describe it briefly: "Tom, a friend living in Hoorn, had finished his middle school with a havo certificate and he had tried to join the Amsterdam police force (this force had one of the hardest training and selection criteria in the Netherlands). Tom failed, but he was told that he could become a 'street officer' (this was one hierarchical level below the hierarchical level he wanted) or a 'desk officer' (this was one hierarchical level above what he wanted). He decided against accepting one of both offers and was left devastated (his dream of becoming a police officer didn't come true). After a very difficult year Tom decided that he had to get an education, so he tried to become a car mechanic, an education for car mechanic requires a mavo certificate (which was lower than his own qualifications). After some initial struggling with the educational level, that was far below Tom's qualifications, Tom fell in love with his new job as a car mechanic. But what was more interesting he lost his motivation to do any other job than his job as a car mechanic. This puzzled me at the time, because why would someone with such high qualifications as Tom be satisfied by a job that had no career prospects at all?

Maarten listened to this story and introduced me to the work of Vroom and Lawler III. He leant me a book on organisational behaviour by Huczynski and Buchanan. This book was my first introduction to the organisational behaviour domain, and more importantly my first lesson in the use of theory. Because when I came around to discuss what I had read with Maarten I noticed that Maarten's view on the information I had just read was much more elaborate than my own. At that point in time, I couldn't quite grasp what caused the difference in thoughts about what we both had read, apart from the experience Maarten had in the field of organisational behaviour.

Looking back to this first struggle with theory, I have to conclude that the process of learning how to do social research started at this point. It was the first time I had to recognise that I needed to know more details about theory before I could actually use it.

Parallel to this start on my BSc thesis, I still had to follow some initial courses. This made identifying my own weakness regarding the use of theory a bit harder, since I could not give full attention to learning the practice of social research. On the other hand, it also provided an incentive to go on and learn as much as possible, because I wanted to finish my BSc as soon as possible.

After two months of struggling with theory, Maarten asked me what I wanted to do for my BSc research. I did not know exactly what I wanted to study at that point in time, I only knew that I wanted to learn more about the organisational behaviour domain and if possible combine it with something new for the domain, for example identifying a new relation between parts of the organisational behaviour domain.

At the end of the process I can say my ambitions were far higher than was realisable at that point in time. Because just two months in the process I still did not learn that understanding a theory requires hours of intensive reading and re-reading. I do think I accomplished the part of contributing to organisational behaviour with this thesis.

Maarten's initial reaction to my bold ambitions was that it was to far fetched, most organisational behaviour scientists were far more specialised on the subject than I was. He therefore suggested to join one of the research projects from the capacity group OOHR. This suggestion provided me with a possibility to discuss my initial enthusiasm on the organisational behaviour domain with André (Veenendaal), he was involved with the 'Competenties voor Innovatie' project, which I thought was interesting to join. André's main responsibility was to research HR factors influencing competencies for innovation, which made my research a new interesting addition to the 'Competenties voor Innovatie' project. André therefore introduced me to the project description and some initial readings on innovation literature (again a subject that has not been covered in my own education). After another month of struggling with combining both innovation and organizational behaviour literature, I found an article by Scott & Bruce.

This was a second important point in the process of writing this thesis, because this was the first time I encountered IWB.

What followed was a process of me trying to come up with a relevant research design concerning IWB.

This process took another month because I still had trouble using theory, this lack of understanding how to use theory really hindered my progress.

Maarten and André helped me in this process. They suggested a comparison between an article by Parker, Williams, & Turner, and an article by Morgeson & Humprey.

This comparison was the first step in my understanding of usage of theory, because comparing two articles word by word, but also on level of analysis, and everything in between finally gave me the insight I needed to use theory. I would recommend such a comparison to each student who wants to learn more on how theory in social sciences should be used.

This process did take another month till the end of April. During our meeting at the end of April, I discussed my ideas on the comparison between both articles suggested by Maarten and André and their relevance to IWB.

The meeting at the end of April was the next important point in the process of writing this thesis, because it was the first session in which Maarten and André approved of some of my ideas. They did this, in my vision, due to an increased understanding of the articles I had compared. This resulted in advancement of this thesis. A remark made by Maarten, during that meeting in April, increased my confidence even further: "All the work you have done, prior to this meeting, has not been for nothing, you'll need it sooner or later.".

This turned out to be true, and drawing from the experience from the comparison between the articles by Parker et al and Morgeson & Humprey I quickly assembled the pieces for the first draft of this thesis, which the three of us discussed at the end of May.

The funny thing is that throughout the process I gathered lots and lots of information on subjects not directly related to the subject of this thesis. This turned out to be quite useful in the meeting at the end of May (in this meeting Maarten and André gave me permission to finish this thesis). Because during this meeting I could show Maarten and André what I have learned from writing this thesis. I

told them about my opinion on both articles and why I prefer the vision of Parker et al on job design, how theory can be used and what processes lay underneath, and how new theory can be formulated based on previous theory.

This brings me to the point where I need to summarise what I've learned from writing this thesis and, my choice of accepting the fact that empirical research was too much for the time given for this thesis.

1. Kurt Lewin once said: "there is nothing as practical as a good theory!", I agree with this statement. Because using proper theory and summarising it in a concise way provides BSc students with an opportunity to learn more about the execution of social research, just like it did for me. Furthermore a good theory is very practical in its implications, as illustrated in the managerial consequences section in this thesis.

2. Ambitions are excellent drivers, but recognising your weaknesses is also an important ability for a person. After I had recognised that combining theoretical research and empirical testing was not an option in the time given for this BSc assignment my progress increased significantly.

3. Most readers will have figured by now that I will not share my trick of how to use theory in this thesis. Even though this trick has been a considerable part of my experience in writing this thesis. I have chosen to do this deliberately, because I know this thesis will be made public and from my own experience I can say that doing a comparison between two publications will provide most students with the information they need to figure out how to use theory by themselves. Plus, and more importantly, doing such a comparison will provide an opportunity to practice using a theory.

4. The combination of teachers involved in a research is essential. Maarten and André formed the ideal combination of teaching staff for me, because one person provided the useful insights I needed by pointing out some articles on subjects I was studying, while the other tested my knowledge of what I was reading. This combination ensured slow but comprehensive progress.

5. The final thing I have learned from this experienced is that I need to develop myself on two new areas: (a) I tend to describe theory and observations as vaguely as possible to protect myself from judgement, this needs to be improved; and (b) if I continue to open up my viewing points on different subjects to others, I can be corrected and improve my communication skills to communicate those points.

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