THE RELATION BETWEEN PERSONAL FEATURES, WORK CONTEXTUAL FACTORS AND INNOVATIVE WORK BEHAVIOUR; AN EXPLORATIVE CASE STUDY AT PHILIPS RESEARCH IN THE NETHERLANDS

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ABSTRACT

The purpose of our case study is to contribute to the knowledge of factors that stimulate the innovative work behaviour (IWB) of employees. The study explores the relationships between work contextual factors (leadership, room for autonomy and innovative external contacts), personal features (creativity and psychological empowerment) and showing this behaviour. We interviewed 7 managers and 27 employees at four departments of Philips Research in a explorative case study from October 2018 until December 2019. A large majority of interviewees (24) showed one or more stages of IWB, 6 showed all 4 stages and 3, no stages. There is a relationship between the stages shown and the purpose of the departments. All of the theoretically formulated work contextual factors and the creative and psychologically empowering personality features influenced IWB. Regarding transformational leadership, we noticed that employees with IWB need a supportive leader who facilitates the innovation process. We observed that employees with IWB showed an optimistic nature when they had to deal with obstacles in the innovation process. Regarding external contacts, it was striking that in a research department, which was a venture itself, a co-creation process with clients stimulated entrepreneurial IWB and created a feedback loop between the development and implementation phase of IWB.

The conceptual model developed as a result of our research can be used in daily management practice in recognizing, facilitating and stimulating employees with IWB. We showcase possibilities to structure and manage organizations to stimulate the creation of new ideas and provide room for creativity by employees with IWB. The personal features required for showing IWB can be used when recruiting employees. When recruiting or coaching managers, it is important to look for or stimulate supportive leadership. IWB has four phases: problem recognition, idea recognition, idea promotion and idea realisation. Of the 27 employees with IWB, 6 showed all four stages, so it is necessary to be descriptive of the kind of innovation required when formulating job requirements. We advise organisations to consider the implementation of co-creation methods. We recommend finding other ways to stimulate innovation than bonus systems because employees are more intrinsically motivated by the impact and meaningfulness of their innovation than money.

Keywords: Innovative work behaviour, case study

1. RELEVANCE OF THE CASE STUDY AND THEORETICAL BACKGROUND

1.1 RELEVANCE

Much has been written about the resistance of employees to innovation. This issue is often viewed from the problem perspective, followed by a range of management tools to cope with it. But there is a growing interest in the individual innovative employee who is creative and determined to deal with organizational obstacles on the path from an idea to a successful innovation (Dorenbosch, Van Engen, & Verhagen, 2005). This phenomenon is called employees with innovative work behaviour (IWB). In our research we collected findings in the literature about IWB and placed them in a holistic conceptual model, which allowed us to do abductive explorative research. That led to a deeper understanding of the relations between several dimensions and made it possible to formulate managerial implications.

1.2 THEORETICAL BACKGROUND

1.2.1 IWB AND INFLUENCING WORK CONTEXTUAL FACTORS GENERALLY

IWB is important for organizations to survive sustainably (De Jong and Den Hartog (2005). The phenomenon of IWB was intensively researched after Scott & Bruce (1994) published on this subject. Dorenbosch, Van Engen and Verhagen (2005) divided IWB into two main dimensions: creativity-oriented and implementation-oriented.

1.2.1. Defining IWB And Its Phases

De Spiegelaere, van Guyes & van Hootegem (2014) argued that a comprehensive definition has not been developed and that many authors rely on the general definition of innovation of West & Farr (1990); they made the following formulation:

"IWB is all employee behaviour aimed at the generation, introduction and/or application (within a role, group or organization) of ideas, processes, products or procedures, new and intended to benefit the relevant unit of adoption"
(De Spiegelaere et al., 2014, pp. 144-145).

We used this definition and the two dimensions of creativity-oriented and implementation-oriented IWB described by Dorenbosch Van Engen and Verhagen (2005) for our research. The creativity-oriented stage is called the development-oriented stage here in order to separate the IWB stages from the personal creative features used in our research.

Development-oriented IWB consists of identifying problems and finding new solutions which sometimes integrate experiences outside the workplace (De Jong and Den Hartog, 2008). The definition of a problem and finding solutions form a complex process that starts with redefining or reconstructing a problem, which requires creativity (Mumford, 2000). The first phase of problem recognition is creating an opportunity, a problem or a puzzle that must be solved, conditions that must be improved, or a threat that requires an immediate response. The product, manufacturing, services and delivery logistics must change (De Jong and Den Hartog, 2008). The next phase of idea generation transforms problem recognition into solutions (Janssen, Schoonebeek & van Looy 1997). A search for every useful new idea starts (De Jong and Den Hartog, 2008).

Implementation-oriented IWB aims to promote and implement an innovation, to create support for the implementation and/or contribute to the effective implementation itself

(Dorenbosch et al, 2005; De Jong and Den Hartog, 2008). In the idea promotion phase, ideas must be legitimized by managers, colleagues or clients, with occasionally coalition formation and negotiation. The innovative employee who starts the process is often not formally identified but feels very connected to the concept (De Jong and Den Hartog, 2008). The last phase of the IWB process is the idea realization, which implies that the ideas are put into practice. This requires adaptation of the processes and procedures, creating new products and a result-oriented attitude (De Jong and Den Hartog, 2008).

Scott and Bruce (1994) argued that each stage requires a different behavior, and individuals with IWB may have competences for being active in any combination of behaviours.

1.2.2 Personal Features of an Employee Related to IWB

De Jong and Den Hartog (2005) formulated determinants of IWB. Expected characteristics of the personality determinant are: tolerance for uncertainty, self-confidence, independence, flexibility, expertise, career anchors and above average intelligence. The relationship between intelligence and innovation is unclear in the literature (Taylor in Harrison 1979; Swaab, 2016; Nusbaum & Silvia 2011). The personality characteristics of tolerance for uncertainty, self-confidence and independence are part of the psychological empowerment theory of Spreitzer (1995, 2008). She also acknowledges the relationship between empowerment and innovation.
The personality characteristics of flexibility, expertise and career anchors (motivators) resemble the description of the characteristics of creativity theory by Amabile (1988/1998). We used the theories of Spreitzer and Amabile as a basis for the description of the personal features of an employee with IWB. We did not use the intelligence feature because of the unclearness of this aspect in the literature. A separate study would be needed before this variable could be used.

The relation of the creative personal features and IWB:

De Jong and Den Hartog (2008, pp. 5-6) defined creativity in the context of IWB. "Creativity is defined as the production of new and useful ideas concerning new products, services, processes and procedures."
Amabile (1989/1998) sees three distinct, broad components that coincide with creativity: expertise, task motivation and creative thinking skills.
The simplest explanation of the concept of expertise is skills. In her model, Amabile (1998) mainly refers to domain-specific skills. Task motivation is a force component that stimulates creativity. One person, in the same environment, can be enthusiastic about a particular work or a particular task, while another experiences it differently. Amabile (1988, p.131) defines creative thinking skills as "a cognitive style favorable to taking new perspectives on problems." The three components of Amabile are used as determinants in our research.

The relation of the psychologically empowering personal features and IWB:

Creativity alone does not lead to IWB, given the possible resistance against change. Therefore, we argue that to show IWB, a psychologically empowering force will be necessary as described by Spreitzer (2008). This is a mental state in which people believe in their role in the organization and understand work as less oriented towards management practices. They share this strength with others on all levels. She describes cognitions of

psychological empowerment as: meaningfulness (the person's assessment of to what extent the value of the task goals corresponds to their own ideals), self-efficacy (the person's belief that they can properly perform a task and be competent in their own capacity), self-determination (a sense of autonomy when taking the initiative and the need to continue working behaviour and processes), impact (the extent to which the person thinks that they can personally influence the results, including weighing the feasibility). The four cognitions of Spreitzer (2008) are used as determinants in our research.

1.2.3 Work Contextual Factors Related to IWB

We took into account three important work contextual influences which are mentioned frequently in research on IWB: transactional or transformational leadership, external innovation contacts and perceived room for autonomy.

Transformational and transactional leadership. The transactional leader focuses more on the result and growth (Quinn; Faerman; Thompson; McGrat &; Bright 2016). Transformational leadership and empowerment are positive influences (Spreitzer 2008). Pieterse, van Knippenberg, Schippers & Stam (2010) found a positive relation between transformational leadership and IWB under the influence of a high psychological empowerment. Bass, Avolio and Jung (1999) described features of both leadership forms used in our interviews and coding process. For the transformational leader these are: charisma, inspiration, intellectual stimulation and individualized consideration; and for the transactional leader: contingent reward, management by exception (active) and passive avoidant.

External innovation contacts. De Jong and Den Hartog (2005) found two environmental characteristics that stimulate innovative behaviour in employees. In the first place, differentiation through competition will encourage companies to distinguish and develop new products or services. This can stimulate employees, as can a heterogeneous demand from customers.

Perceived room for autonomy. Autonomy is the space that the employee gets from the organization to influence the goals and organization of the work, as well as the ability to be independent and fill the space offered (Kessels, 2004). In our final conceptual model, it concerns the space that the employee gets from the organization. Lumpkin, Cogliser and Schneider (2009) referred to this as the perceived room for autonomy, since the organization structures this space, but each employee will experience this in their own way. The personal ability to fill in the space, as mentioned by Kessels (2004), is part of the psychological empowerment in our final conceptual model and is contained in the determinants self-determination and self-activity. Bos-Nehles, Renkema & Janssen (2017) found that in many studies, the scope for autonomy offered by the organization appears to have a positive influence on IWB.

1.2.4 The Thoretical Base for our Research Summarized

IWB is important for organizations to survive sustainably (De Jong and Den Hartog (2005). The theory of IWB needs further exploration. We argued that creative innovative personality features (Amabile, 1988/1998) and psychologically empowering personality features (Spreitzer, 1995/2008) are related to IWB. As related work contextual factors on IWB we found: transformational or transactional leadership (Bass, 1990), perceived room

for autonomy (Bos-Nehles & Janssen 2017) and being in contact with the outside world of an organization (De Jong and Den Hartog 2005) .

2. RESEARCH OBJECTIVES

The scientific contribution of this case study involves connecting several theories of IWB, innovative personality features and work contextual factors into one holistic conceptual model and providing a deeper insight into the relations between several dimensions. This knowledge can be helpful to identify, understand and facilitate employees with IWB and give guidelines for the management practice to stimulate the creativity and new ideas of employees with IWB.

3. RESEARCH QUESTION

How do the relationships between innovative personality features (creativity and psychological empowerment) and work contextual factors (transformational leadership, perceived room for autonomy and external innovative contacts) influence employees showing IWB in their work units?

4. DESIGH, METHODOLOGY AND APPROACH

Although we found several IWB-related dimensions in the literature, we chose a qualitative explorative method, rather than quantitative, to get a deeper insight into the relations.
The duration of the interviews depended on the information saturation point, which averaged 45 minutes.
To be sure that innovation is a daily activity, we chose Philips, with the highest R&D budget of all Dutch companies in 2016 (Waardenburg, 2017).
Because we simultaneously investigated the phenomenon of IWB, work contextual factors and personal features, a qualitative explorative case study method was chosen (Yin, 2018; Swanborn, 2013).

Methodology used for the determination of four case study departments:

The case study departments were selected by interviewing seven department heads, to establish two of the three work contextual factors: leadership and room for autonomy from the manager's perspective.
The third possible influencing relationship, whether the employee with IWB has related external contacts, we explored at the individual employee level.
After getting a request by e-mail, some department managers volunteered to participate.

The interviews with managers and employees were transcribed and coded using the ATLAS.ti software. The dimensions found in the literature study were used for a direct axial coding. New explorative findings were open coded and later on axially bundled. The data about room for autonomy was collected in interviews, and by using a validated questionnaire of Lumpkin, Cogliser and Schneider (2009). This two outcomes were confronted with each other, leading to a triangulated, congruent outcome.

We only met transformational leaders. We selected four research departments out of seven, and their features are shown in table 2.

Department 1	Venture Research. Very high perceived autonomy, transformational leader, pilot start-up with more freedom and selling products directly to the market.
Department 2	Low perceived autonomy, transformational leader.
Department 3	High perceived autonomy, transformational leader.
Department 4	Middle/low perceived autonomy, transformational leader.

Table 1 The selected departments and their features

Methodology used in the case study:

In phase 2, we conducted 27 in-depth interviews with employees, who volunteered after receiving a collective invitation. The interviewees were representative on the basis of the characteristics: male / female, length of employment and age.
The interviews were fully transcribed and then analyzed with coding. We used the ATLAS-ti software for this process. In the interviews we asked questions about the employees' perception of the leadership style of their managers and the influence of the work contextual factors. The employees also completed the questionnaire based on the items from the autonomy scale of Lumpkin, Cogliser and Schneider (2009). The coding was done in an open and axial manner, along with the abductive method we used. The codes found in the literature were selected, and open codes were exploratively noted and later on axially bundled.
As triangulation, two extra interviews were held with top managers to discuss the findings. They recognized the outcomes and found the report useful for the organizational change process that was taking place at the time of reporting. We applied the method of intercoder reliability for triangulation worked out by Campbell, Quincy, Osserman, & Pedersen (2013). A fellow PhD researcher at the University of Twente coded three transcripts again using the code list of the first coder in isolation, which gave some new codes that were used after a second coding process of all transcriptions.

5. EMPIRICAL RESULTS

A large majority of the 24 interviewees showed one or more stages of IWB, 6 showed all four stages and 3, no stages. In table 3 you will find some example quotes representing the 4 phases of IWB. There is a relationship between the stages shown and the purpose of the departments in which the employees worked, as evident in table 2.

Department	Employees with IWB	Interviews	Problem recognition	Idea generation	Idea promotion	Idea realisation	Total
1	8	8	2	3	5	6	16
2	7	7	4	5	6	3	18
3	6	6	2	5	5	4	16
4	3	6	1	2	3	2	8
totals	24	27	9	15	19	15	58

Table 2 shows the number of employees of every department who quoted stages of IWB

Explanation of table 2. The IWB in department 1 is evident in the promotion and realisation stages. This is likely due to its direct access to the market. In department 2 the IWB is concentrated less on realisation. The rationale is that this is purely a research department and not a venture. The problem recognition stage of IWB in department 3 was not often mentioned. This is likely because this department gives technical solutions to

other departments which bring their problems to it. IWB in department 4 was low overall. This department has to deal with medical safety rules and laws.

Problem recognition	"I think I'm on the one side, partly right at the beginning, trying to identify the problem, what's going on, what do we really need now."(3.1.)
Idea generation	"It is innovative to search for solutions." (1.4.)
Idea promotion	"First I see who I have to convince and how to nurture them if I can put it like that." (4.2.)
Idea realisation	"Well, so let's say I'm the bridge between the market and research." (2.5)

Table 3 Some example quotes about stages of IWB found by axial coding

All of the theoretically formulated work contextual factors and the creative and psychologically empowering personality features influenced IWB. In table 4 we present some example quotes. A majority of the employees with IWB were motivated by the impact and meaningfulness of their innovation and not by bonuses or high earnings. One interviewee who showed all four stages of IWB quoted that an optimistic nature is necessary for IWB (see table 5), and we observed that all employees with IWB had an optimistic nature when they had to deal with obstacles in the innovation process.

It was interesting to see that employees who showed all four stages of IWB talked about all of the creative and empowering features. Those who showed no stages of IWB quoted almost none of the creative and empowering features.

Creative thinking skills	"I tried to do things totally out of the box." (3.4)
Expertise	"I also think that I am good in my field, technically speaking."(1.3)
Task motivation	"I still have the greatest job at Philips." (4.2)
Impact	"I think that we have the ability to improve human lives in house." (2.4)
Meaningfulness	"I like to be helpful for people because for me, humanity deserves equal healthcare especially."(3.4)
Self-determination	"I spent some time thinking about what place would I want to be and would I enjoy being in, and I saw a European Union country with a good job market and lifestyle that fits with my needs, so the Netherlands. Part of my decision to come here."(3.2)
Self-efficacy	"But you have to let yourself be driven very strongly by your own insights." (2.3)
IWB stimulating leadership	"I like my supervisor very much. Is very open. And doesn't like nonsense either, I think. And certainly gives me a chance to deal with things. And also works as a facilitator."(2.1)
IWB stimulating	"If you never talk to people outside the company, you can come up with a fantastic idea that no one wants."(1.3)

external contacts	
IWB stimulating room for autonomy	“Possibly, I do think there is a lot of freedom. I think with the projects as well, there’s a lot more freedom to play within the projects.” (3.3)

Table 4 Some example quotes about the personality determinants and possible related work contextual factors founded by axial coding

Money and bonusses don’t motivate	“Money is something that doesn't interest me personally at all. I like the fact that I can manage financially without too much worry. I don't necessarily have to earn or get more. It is of course fun or funny, but it is not the case that I would go to another company or employer because of bonuses, not at all.” (1.7)
Optimism	"I think you have to have a dose of optimism to start something new, and I think that's a character thing, too." (2.5)
Supportive leadership	“Yes, then it has to be lobbied and spoken about a lot to get that done, and then it is nice if the group leader is enthusiastic about the subject and is also engrossed in learning what exactly is the power of solution that we have.” (2.3)

Table 5 Some explorative example quotes found by open coding

Within transformational leadership, we noticed that employees with IWB need support from their manager. The degree of formalization has a transactional effect on innovation. Some managers shield their employees so that they have more freedom to innovate than officially allowed. Having external, innovative contacts, especially when co-creating with customers or other stakeholders, has a stimulating influence on IWB and creates a feedback loop between the developing and implementation phases of IWB. Our observations show that there is a big difference in the innovation energy that the employees showed during the interviews. People sat very differently at the table: combative, tired, enterprising, active, passive, contrary, cooperative. As a result, we updated conceptual model 1.0 to create conceptual model 2.0 by supplementing it with the explorative findings.

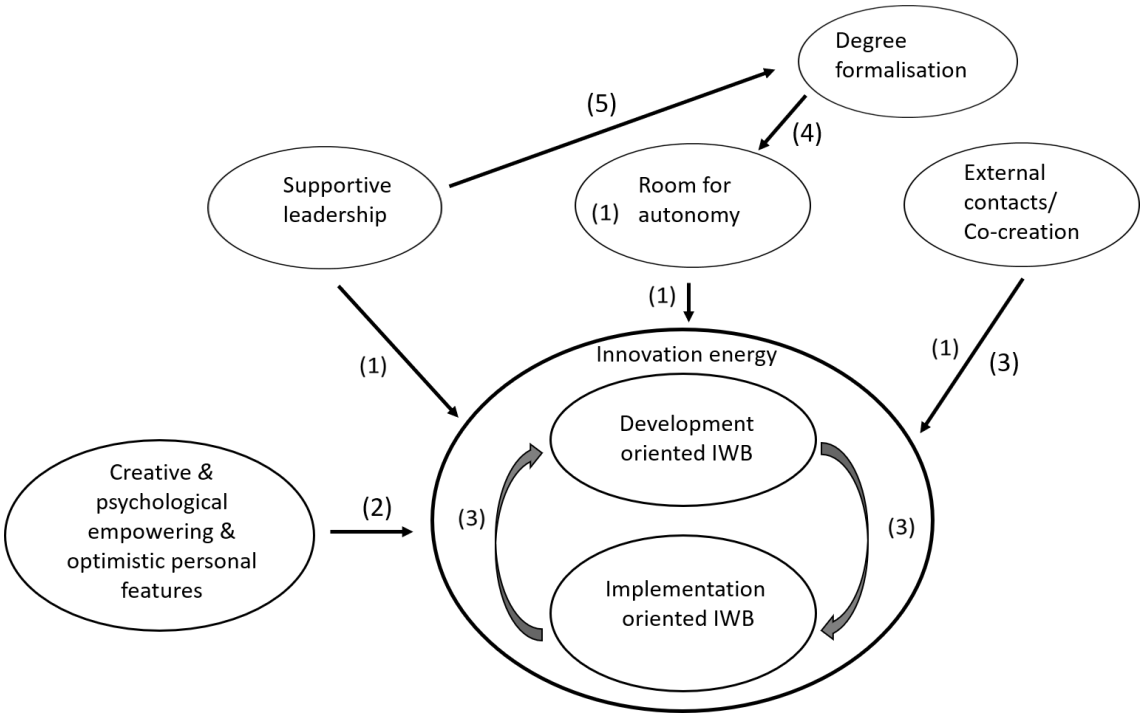

Figure 1 Conceptual model IWB and influencing factors

Explanation of this conceptual model:

1. Supportive leadership, room for autonomy and external, innovative contacts stimulate innovation energy and IWB among employees.
2. Creative, psychologically empowering and optimistic personality features stimulate innovation energy and IWB.
3. Co-creating with customers (and other stakeholders) during the innovation process creates a feedback loop between development-oriented IWB and implementation-oriented IWB.
4. The degree of formalization limits the room for autonomy.
5. The degree of formalization can be limited by supportive leadership.

6. DISCUSSION

Relation of innovative personality features and employees showing IWB

Employees who show one or more stages of IWB have creative or psychologically empowering personality features which stimulate IWB. This outcome of the research confirms the conclusion of our literature study that it is necessary to be creative and empowered to display IWB (Amabile, 1988/1998; Spreitzer, 2008/ 1995; Dorenbosch, Van Engen and Verhagen, 2005). And a new personality feature was formulated: an optimistic nature makes it easier to deal with all the influential dimensions on IWB.

Relation of work contextual factors and employees showing IWB.

Employees with IWB strive strongly for autonomy, are empowered and quoted that a transformational leader stimulates their IWB. The dimensions of Bass, Avolio, & Jung (1999) were recognized here. The employees do not need someone who interferes in the

research process itself, which is also not possible most of the time because the manager has a different expertise than the employee. In an environment with a high degree of formalization, they need a leader who acts to secure plenty of room for autonomy in their own department. This finding is related to the research of De Jong and Den Hartog (2007) which depicts that leaders who stimulate innovation behaviour among employees ensure sufficient autonomy, recognize and stimulate innovative initiatives, and create a positive, safe atmosphere in which openness and risk-taking are encouraged. In our new conceptual model we call the explorative-found, IWB-stimulating form of leadership "supportive leadership".
The pilot-venturing department situation revealed that creating a direct connection between research and the market stimulates IWB, leads to a feedback loop between the development-oriented and the implementation-oriented stages of IWB and makes the employees more entrepreneurial.

7. CONCLUSION

7.1. IMPLICATIONS FOR THE MANAGEMENT OF IDEAS AND CREATIVITY

This research provides insights to recognize, facilitate and stimulate IWB. When recruiting new employees, the personal creative and psychological empowering features can be included in the selection interviews and assessment research. When recruiting or training managers, supportive leadership should be a focus. In designing organizations, room for autonomy for employees and managers to show IWB and supportive leadership should be included. Give leaders the freedom to follow their own judgement in obeying organizational procedures in order to be able to make room for IWB.
We found that linking research and development to the market, especially the users of the new products, stimulates entrepreneurial IWB and a feedback loop between the development and realization phases of IWB.
If the task of a department is tightly regulated, for example by legal frameworks, appointing innovative employees could be counterproductive. Related to their own personal characteristics and the function of the department, most employees showed only certain phases of IWB. Creating collaboration between different departments and multidisciplinary working can offer a solution, so that all four phases of IWB are present in product development or process improvements. Job profiles usually list the innovation competence in job vacancies. However, our study showed that only 6 of the 27 interviewees mastered all 4 innovation phases. If possible, the job profile could be more effective by specifying competences that serve these phases.
Finally, most employees in our case who showed IWB were intrinsically motivated by the impact and meaningfulness of their innovation and not by bonuses. Perhaps it is better to use the bonus budget to give employees more autonomy in their job and time to be in contact with the outside world.

8. LIMITATIONS

This PhD research provides empirical data based on the Dutch situation in a high-tech organization; further quantitative research into more sectors and countries can increase the external validity of the findings. The present research was done under highly innovative circumstances in research departments and therefore has an emphasis on product innovation; more research is necessary to explore whether the findings and

conclusions also have external validity in the process innovation. The explorative new elements in our conceptual model need further theoretical and empirical confirmation. We will explore this ourselves in a second case study in a highly innovative IT company Topicus in the Netherlands.

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