THE ROLE OF LEADERSHIP IN OPEN INNOVATION

MASTER'S THESIS REPORT

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Acronyms

GDPR General Data Protection Regulation 32
OI Open Innovation 4, 11, 47, 50
OIB Open Innovation Behavior 4, 47, 50
OIO Open Innovation Output 4,50
LB Leadership Behavior 4, 50

Management Summary

Open innovation ensures that there is a mutual flow of knowledge and skills between organizations. In this regard, the focus of open innovation is on forming mutually beneficial connections that can ensure competitive advantage. The market gets optimized processes and technologies, and the organization can achieve profitability. Although open innovation can have many benefits, it also brings challenges. The most important is the support within an organization to adopt open innovation. Employees are critical to open innovation. If organizations want to achieve successful open innovation, they must embed open innovation into the organization's mission and vision. This report maps the relationships between middle management leadership behaviors and employee open innovation behaviors. Leadership behaviors focus on developing the behaviors of employees and leaders themselves in relation to open innovation. Leadership encourages the development of employees' personal and professional skills. Leadership emphasizes decisions to build and maintain relationships and to promote open innovation behavior among employees, thus stimulating open innovation within the organization. Semi-structured interviews based on an exploratory qualitative method were used for this research. Interviews were conducted with 12 participants. Six leadership experts and six employees from different areas in the Netherlands were selected for this purpose. This research conducted a multilevel analysis and found that leadership behaviors drive important organizational changes related to open innovation and improve open innovation behaviors of employees.

To implement open innovation within the organization, open innovation must be integrated into the mission and mandate of the organization. This creates effective collaboration between leaders and employees. Leadership can enable the use of leadership behaviors that can develop skills and competencies critical to open innovation. In addition, leadership behaviors have been found to influence employee behaviors related to open innovation when it comes to improving knowledge acquisition and sharing. In addition, employees are motivated to enter into external relationships with other organizations.

Leadership behavior influences employee knowledge and skills. Leaders can influence the way employees acquire and share knowledge outside the organization and stimulate employees' open innovation behavior. Similarly, they can develop in the area of communication to foster useful long-term relationships.

In addition, more transparency, less time pressure, and the provision of support are important for gathering and sharing knowledge and building partnerships.

This work has demonstrated effective leadership behaviors that can improve employee skills and competencies and specified the shift in organizational goals from open innovation to open employee innovation behaviors. Development within the organization can be accomplished by improving open communication and bonds between leaders-employees. In addition, there must be open communication between leaders and employees to motivate them to participate in open innovation activities. This research suggests that leadership behaviors can improve employees' open innovation behaviors by developing these behaviors in two phases of open innovation: obtaining ideas from external sources and idea integration. Open innovation involves individual employees and leaders, which can improve the output of open innovation in the organization.

1 Introduction

Kimberly (1981, p.86) defined innovation management as *"any program, product, or technique that presents a distinctive departure from the state of the art of management at the point it first emerges, and which influences the nature, location, quality or quantity of information available in the decision-making process''*. In addition, the knowledge and inventiveness of employees are critical to the organization's innovation success and to prevent the organization from evaporating, innovating, or evaporating (Higgins, 1995). In addition, employees' ability to innovate is seen as something special that allows products to be optimized in a certain way, which ensures a competitive advantage in the market. Due to the increasing competition in the market, innovation needs to be faster and more effective in order to monitor an organization's market share.

The shift away from strategic and efficient management of the mass market and the use of knowledge also forces organizations and their leaders to adapt. Leadership therefore plays an important role in innovation management. Over the years, several researchers have provided a list of leadership factors (Oke, 2009; Lukowski, 2017; Fontana, 2017; Denti, 2012). One example is the leader's mental state, a factor that is critical in leadership. The mental state can be influenced by the leader's environment and the scope of action the leader has. Denti (2012) focused on the factors that moderate or mediate the relationship between leadership and innovation. Another example is the organizational culture factor. Behavioral expectations within an organization create the situation in which employees find themselves. Moreover, some have examined how leadership styles, such as transactional and transformational leadership influence innovation management, (Oke, 2009; Lukowski, 2017). In addition, Fontana (2017) focused on the relationship between entrepreneurial leadership and the innovation process. The article provides empirical insight into the impact of entrepreneurial leadership by highlighting all elements of the innovation process. These elements are idea generation, idea selection and development, and idea diffusion. It was noted that the article confirms the difficulty of mapping a significant relationship between innovation processes and innovation performance. Each study should be considered as a foundation for the role of leadership in open innovation. Each contains essential factors and components of an

innovation approach. This research aims to realize a new layer of soil on the current foundation.

West (2014) defines open innovation as knowledge that both flows in and out to make internal innovation within an organization more efficient and to expand the use of innovation in the marketplace. Open innovation offers an explanation for the innovation process to bring in external experts to develop products. Thus, the generation of ideas and the development of technologies can extend beyond the boundaries of an organization. Ideas can be generated both internally and externally. A company can gather knowledge internally in the various departments of the company, such as the finance department. However, the company may also choose to gather ideas outside the company, for example, from suppliers. If companies focus only on internal collection, external opportunities that increase company value may be missed.

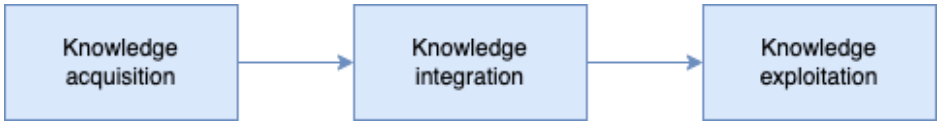

Figure 1 Phases of OI

Open innovation consists of the following three phases:

- Knowledge acquisition: gaining external ideas outside the company, for example from suppliers. In doing so, companies must share this useful knowledge within the organization (Kutvonen, 2011).
- Knowledge integration: when an external idea is captured, it is possible to build on it as a company. The existing knowledge should be merged with the new source of information (Yang, 2005).
- Knowledge exploitation: avoiding 'profit only' externalization of products. Seeking more strategic, long-term control over a company's vision of the future, accompanied by trusting relationships (Davis, 2002).

Based on this research, a framework can be established to measure the open innovation process. Therefore, it is possible to establish indicators that can be used to measure open innovation at the individual level from the employees' perspective (Hughes et al., 2018). It can be measured how often companies collaborate in the outside-in process of R&D management, for example with customers, suppliers or competitors (Inauen et al., 2011).

Winston (2006) defined a leader as one or more individuals who coach and influence those who select employees with different skills and abilities. When leaders ensure that employees

are familiarized with an organization's mission and vision, it excites employees, causing them to mobilize their emotional and physical energy in a coordinated way toward the organization's mission and vision. It highlights that it is an effective tool in an organization to improve open innovation (Chen et al., 2018). Effective leadership includes aspects such as drive, ambition, honesty, integrity, confidence, and intelligence (Kirkpatick & Locke, 1991). The right leadership style is critical given the proliferation of complex innovations (Marion et al., 2001). This is because employees play a critical role in achieving a competitive advantage for a company (Lengnick-Hall, 1992). Employee motivation and confidence increase when the right leadership style is implemented (Rad et al., 2006). From the perspective of open innovation, the specific leadership style is important in various activities such as coaching, motivating, and managing employees. The success of open innovation depends on the leadership style (Naqshbandi et al., 2018b).

Several researchers have elaborated different leadership styles, one of them is Bass (1990). He divided leadership style into two categories: transactional and transformational leadership. Transactional leadership corresponds to a task-oriented, control-oriented style with a tight management structure. Transformational leadership, on the other hand, focuses on inspiring employees and is based on communication and partnership. It is also claimed that transformational leadership enables open innovation behavior that leads to creativity. This is because this leadership style focuses on encouraging proactive behaviors (Buil et al., 2019). It is also suggested that transformational leads to creativity, which ultimately influences organizational innovation (Gumusluoglu & Ilsev, 2009). We therefore assume that transformative leadership influences open innovation (Gad David et al., 2021). In addition, it has the potential to foster learning experiences for its employees to adopt new ways of thinking (Al-Amin, 2017). This will be discussed in more detail in the literature review. In addition, the leadership role influences the management of employees' innovation capabilities within the organization. The skills, actions, and attitudes of followers are influenced by this. If an organization wants to improve open innovation output, it should use a specific leadership style to encourage employees to improve open innovation output (West & Bogers, 2017). It is believed that a specific leadership style can influence employees' ability to acquire and share knowledge during the innovation process (Iqbal et al., 2015). However, this relationship has not been further investigated.

1.1 Problem statement

Nowadays, the competitive landscape has changed dramatically considering the advancement of technology and direct globalization. Companies need to monitor their market position by developing more innovative products. In addition, the acquisition and development of new knowledge must be practical and effective. Chesbrough (2003), who is also called ''the father of open innovation'' defines open innovation as ''the optimal use of both internal and external information'' (p.52). Open innovation allows creative people outside the organization to contribute to strategic goals and share information in both directions, which is mutually beneficial. The more information gathered, the better decisions can be made, leading to a competitive advantage. Open innovation, in combination with knowledge management, enables companies to take the lead in the marketplace. The company's employees also play an essential role in the development of open innovation. They enable knowledge to be acquired and shared, thus leveraging current capabilities to gain a competitive advantage in the marketplace. Therefore, it is critical to effectively manage these employees to optimize a company's open innovation output. However, it is still unclear what are the distinctive characteristics of employees that influence the open innovation output of a company.

We see a widespread trend of organizations that use external capabilities and knowledge sources to broaden knowledge boundaries. Where collaborative relationships influence the goals of open innovation, especially in the digital convergence sector (Lee et al., 2008). Looking at the open innovation of employees in an organization, these include effective participation in idea generation and concept implementation. These activities are effectively managed by leadership by encouraging employees to collaborate in the creation, transformation, and use of knowledge (Yang, 2007). When an organization supports open innovation, it ensures that creativity, teamwork, and trusting relationships with employees are accepted (Antikainen et al., 2010). The role of a particular leadership style strengthens the existence of open innovation. It applies a purposeful strategy to effectively leverage internal and external knowledge flows (Brunswicker et al., 2015).

1.2 Knowledge gap

Recent literature has focused on strategic leadership in conjunction with organizational innovation (Kesting et al., 2015). In addition, the use of a particular leadership style can optimize information sharing, achieve collaborative benefits, and reshape interpersonal relationship building skills (Engelsberger et al., 2021). Furthermore, previous literature has shown that there is a relationship between leadership and open innovation (Naqshbandi et al., 2018a; Fleming et al., 2007). However, this specification has no impact on employee knowledge flows related to open innovation. To address these difficulties in knowledge management, the specific leadership style needs to be revised to improve performance in open innovation. To date, most research has focused on process execution and the impact on innovation at the organizational level (Damanpour & Schneider, 2006). Previous research has shown that companies can use an open innovation strategy to enter new markets. Although a comprehensive review of open innovation progress has been developed, there is limited evidence on how to manage open innovation processes using a leadership style (Edelbroek et al., 2019). In addition, several researchers suggest that the factors influencing the employees involved in the innovation process should be investigated in more detail (de Jong et al., 2007; Jung et al, 2003). Consequently, the current paradigm of open innovation needs to be expanded. Here we take a look at the leadership dimension and its impact on the output of open innovation in a firm. A firm's innovation environment is closely related to leadership management and employees' open innovation behavior. Therefore, it is necessary to take a closer look at how specific leadership styles can foster open innovation in organizations. We hypothesize that a specific ideal leadership style for open innovation can lead to an increase in open innovation behavior for exemplary knowledge collection. This research gap is referred to as the knowledge gap.

1.3 Thesis Structure

With regard to this master thesis, a literature review is conducted to determine which leadership behavior is best suited to increase employees' open innovation behavior. A literature review was fulfilled to establish the link between leadership behaviors and open innovation behaviors. Figure 2 shows the research methodology. It shows the steps taken

during the graduation process. After mapping the relationship, a qualitative research was conducted.

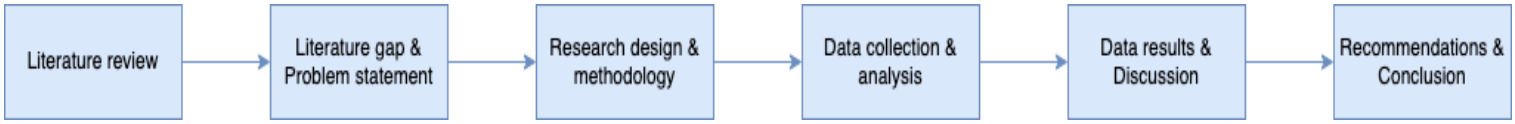

Figure 2 Research methodology

Data collection was done through semi-structured interviews. The data collected is processed through content analysis to draw out themes. Chapter 2 takes a look at the literature on leadership and open innovation. Chapter 3 looks at the research methodology, including the collection of research data. Subsequently, the results of the research are described in chapter 4. The discussion in combination with the theoretical implications are discussed in chapter 5. In chapters 6 & 7 the practical implications, limitations and future research are discussed. Finally, the conclusion of the thesis is discussed in chapter 8.

2 Theory background

For the research, a preliminary literature search was first conducted. Platforms such as Google Scholar were mainly used for this purpose. In addition, scientific papers were collected from Elsevier, Research Gate and Emerald. The keywords such as: Open innovation and Leadership were used in this preliminary study. This resulted in numerous results ranging from 1970 to 2021. In addition, these results were filtered by the number of citations to check for reliability. Specifically, 20 results were read more in depth to gain more knowledge about the topic. Subsequently, the focus was on leadership styles and their impact on open innovation. Only English language literature was used. Additional literature was found using snowballing, checking the reference list of the most relevant articles.
After mapping the knowledge gap and formulating the research questions, a research method was selected.

2.1 Open innovation paradigm

If we look at the term open innovation, we find that it comes from Chesbrough (2003). He was the first to define the term and distinguish that companies should use ideas both internally and externally to promote the market position of their own technology. In addition, Dahlander (2010) defined the term open innovation and suggested that companies should focus on collecting helpful tools from external relationships and sharing in-house tools for the development of new processes. In addition, Holmqvist (2004) defined open innovation as a means to engage in external collaborations. Open innovation is a measure for managing information movement and maintaining organizational outer limits (Easterby-Smith et al., 2008). Despite the interpretations differ, they all aim attention at one principle, the two-way movement of information and tools between firms. In contrast, when we look at closed innovation, innovation takes place within the boundaries of an organization. It turns out that the exchange and recruitment of information with external relationships is practically zero and new ideas can only be used within the company.

Since open innovation uses both internal and external sources, open innovation cannot be mapped only at the level of an organization. Bogers (2017) analyzes four levels, including:

- Inter-organizational level
- intra-organizational level
- Extra-organizational level
- Industrial, regional and community level

If we look at the inter-organization of open innovation, it occurs when an organization partners with a partner to further develop an idea. The ideas are worked out together in a close relationship. In intra-organizations, it is internal departments or business units that enter into a relationship and collaborate with each other. In addition, extra-organizational relationships can also be entered into, where external stakeholders are closely involved in the innovation process. Whether this is to contribute to the creation of new knowledge or to obtain knowledge themselves to generate innovation. Due to the complex nature of innovation, there are unforeseen circumstances at the industry level that affect the relationships.

Figure 3 provides an illustrative representation of outside-in and inside-out open innovation. It is possible to use open innovation as a means to engage with the public to gain insights into what functional requirements users want. This phenomenon is also referred to as outside-in open innovation. Organizations tap into external sources and then leverage them within the organization. This reduces the time it takes to map ideas, which immediately translates into a reduction in the organization's costs. It is also possible for organizations to form a long-term relationship with other organizations. This is done in order to grow as effectively and gain a mutual benefit. Contrast this with the inside-out phenomenon of open innovation, where benefits are derived from knowledge generated within the organization.

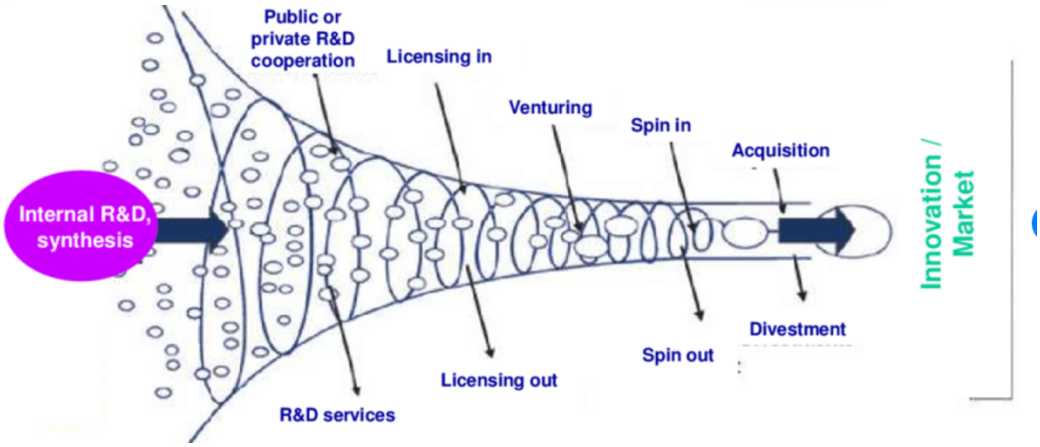

Figure 3 Open innovation tools in the innovation process Sachwald (2022)

This research specifically looks at the outside-in process of open innovation in order to collect external knowledge to achieve internal objectives and also to realize high innovation output effects of the organizations.

Open innovation can be viewed from different angles. The knowledge management perspective assumes that knowledge management and employee absorptive capacity have an impact on open innovation (Naqshbandi et al., 2018b). It has also been shown that in innovation behavior, relationship and knowledge sharing are related to open innovation (Singh et al. 2021). In addition, it is also important to consider employees' decisiveness. Employees find that multiple activities influence innovation, which can grant an organization a better market position (Holsapple et al., 2001).

2.1.1 Knowledge management perspective

Approaching open innovation affects various positions of a company. It is important that companies adapt in order to achieve sustained growth. Sharkie (2003, p. 21) defined Knowledge Management as *''Developing the knowledge and skills to use the resources to create competitive advantage by effectively managing the value chain''*. In contrast, it is argued that competitive advantage can be achieved through focused management of employees and that competitive advantage is sustainable. This is because the causes of success are untraceable and difficult to imitate, resulting in an advantage being gained (Pfeffer, 1995). Van Beveren (2002) supports this argument that a person's knowledge is critical to acquiring and using knowledge in various applications. This can be translated into a knowledge management perspective, which refers to managing the inflow and outflow of knowledge. Knowledge management can therefore create relationships and fruitful work that lead to the success of open innovation efforts (Lam et al., 2021).

If we take a look at the assumption of organizational knowledge creation, we see that processes for acquiring knowledge are realized in a systematic way. In an innovation process, collaborative work environments are hardly used as potential tools for knowledge acquisition. Circular thinking and potentially fruitful ideas drive the growth of profitability (Roffe, 1999). Open-source systems can ensure that innovation capacity is exceeded by increasing knowledge lines. Wu & Hu (2018) state that knowledge management capabilities are critical

for open innovation. Concrete tools associated with knowledge can lead to competitive advantage (Rohrbeck et al., 2009).

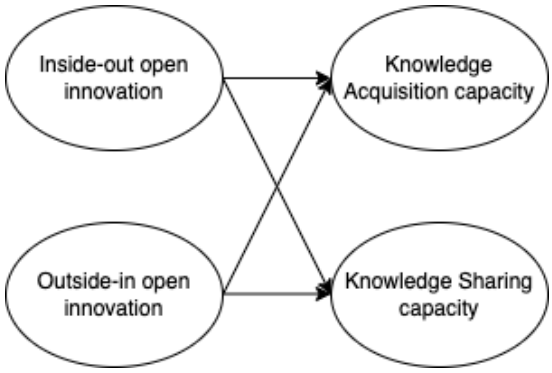

Figure 4 Knowledge management framework, Sun et al. (2020)

According to Sun, Liu, and Ding (2020), knowledge management capabilities have two dimensions: knowledge acquisition capability and knowledge sharing capability, which is shown in Figure 4.

Knowledge acquisition capability deals with the crucial ability of organizations to bring in external information in this way. Knowledge acquisition is the organ of an organization's learning and transformation capability (Kotabe et al., 2011). This ensures that organizations can achieve organizational innovation.

This includes knowledge sharing, a complicated formation of internal and external knowledge that includes the sharing of knowledge from different organizations (Du Plessis, 2007). The ability of organizations to leverage information influences their problem-solving ability and, at the same time, their response to newly acquired information.

Open innovation enables effective management of innovation activities. The openness of organizations determines the acquisition of knowledge sources, which ensures optimal knowledge management (Sun et al., 2020).

2.1.2 Open Innovation behavior

Previous literature identifies open innovation as a process consisting of two parts: Initiation and Implementation (Gopalakrishnan & Damanpour, 1997). These two parts are separated at the point where an organization adopts an idea, i.e., at the stage of a process where the decision is made to implement the innovation within the organization. The first stage of development ends with the production of an idea, and the second part ends with the

implementation of an idea (Taştan, 2013). A large number of most studies focus on the idea generation phase of an innovation (Paulus, 2000; Anderson et al., 2014). On the other hand, the implementation of an idea is also associated with an innovation process. The focus in innovation behavior is on specific behavior related to the introduction and implementation of new useful ideas or processes within an organization (De Jong et al., 2007). The term open innovation behaviors have not been used before, but by this we mean the behavior during the open innovation process that is necessary to collect external ideas and knowledge for the organization. In addition, open innovation behavior can be perceived as an overarching construction in which all behaviors are determined, this ensures that the employees can contribute to the open innovation process. In this research, the focus is on two innovation behaviors that reflect the two parts of the process: Idea sourcing behaviors from external sources and idea integration behaviors. Previous research shows that these behaviors are critical to the innovation process (Tuominen & Toivonen, 2011). To introduce an innovation in a company, employees may engage in certain behaviors during the idea generation process, such as exploring possibilities and considering solutions to problems.

Opportunities for idea generation are hidden behind inconsistencies, i.e., things that are important but do not fit together in predicted patterns, such as problems in current work methods or unrealized customer needs. In addition, employees in the implementation phase can play a crucial role in the innovation process by exhibiting integration behavior. Employees who are enthusiastic about a particular idea can convince others of it by raising awareness of the idea's value. In addition, employees can demonstrate their behavior by participating in the development, testing, and marketing of ideas. Innovative behavior is also associated with creativity. Several researchers have proposed methods of creativity that simultaneously involve the implementation of creative ideas. Bacot (2000) distinguishes between problem finding, problem solving, and solution implementation. Complementing this, Puccio et al. (2012) propose to divide creative problem solving into early and late cycle phases. The early cycle refers to idea generation, and the late cycle refers to idea implementation. The second stage is considered an incipient problem. Other source, however, sees differences between innovative behavior and creativity. Abdullah et al. (2016) made a distinction between these two terms. Creativity is seen as the production of useful ideas in a particular area. In which

innovative behavior is seen as the drag with regard to the implementation of creative ideas in the organization.
Innovative behavior has a special aspect, namely the creation of an advantage. The reason for this is that the term presupposes an innovative implementation.

However, it cannot be said that open innovation behavior focuses only on the production of new products or processes (Kleysen and Street, 2001). We argue that creativity is an important component of open innovation behavior, it occurs in the first phase of the innovation process, where problems are mapped and idea generation occurs based on the motivation for innovation (Taştan, 2013). In addition, Howell and Boies (2004) suggested that differences in leadership behaviors are not seen in the two phases, with contemporary study recommending that the two phases be separated in the innovation process. This allows us to separate the two stages from each other: **obtaining ideas from external sources and idea integration**.

2.2 Leadership

This section discusses the literature on leadership and leadership styles in particular. Based on the theory, different leadership styles have been found.
In terms of leadership theories over the past decade, six main theories of leadership have emerged. Figure 5 shows a timeline of the different theories and when they were mainly applied.

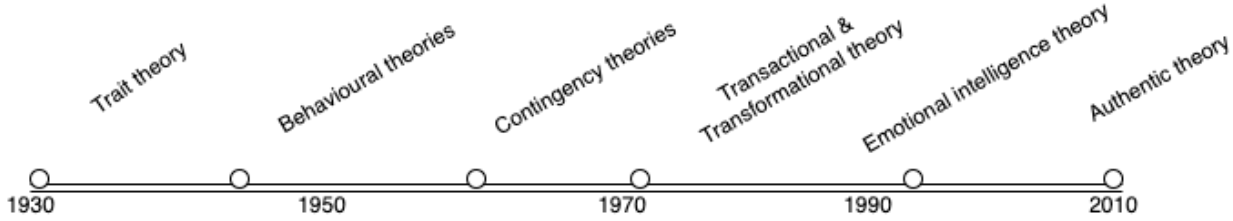

Figure 5 Timeline of leadership theories

If we look at trait theory, we see that effective have common characteristics. Where leaders are born and not something that can be taught (Horner, 1997). The traits can be categorized under three classes: ability, personality, and physical stature. The last aspect reinforces that a leader cannot be taught nor molded. Kirckpatick (1991) differentiated six diverse traits of successful leadership.

- Persons' will to achieve and Affection
- Ambition to lead and impact subordinates
- Relevant knowledge and experience
- Faithfulness and Righteousness
- Self-confidence
- Ability to perceive

These aspects build a fracture in the traits. This has to do with the fact that the aspect mentioned above such as Relevant knowledge can be taught.
Behavioral theory states that effective leaders use certain behaviors that can be taught (Yuki, 2012). This includes the observation and evaluation of the actions and behavior of the leader at the moment when a specific situation is reacted to. Basically, an effective leader can be created by learning specific behaviors.

Later, the theory was modified in the 1940s to state that effective leaders are not born, but can be shaped and trained to be effective leaders. According to this theory, leaders were tested on variables such as (Yuki, 1971):

- Taking care of people or relationships
- Taking care of production
- Using of authority
- Involving the team in decision making
- Balancing of flexibility versus rules

Building on behavioral theory, additions to various behaviors in various states have been deemed appropriate (Fiedler, 1978). In particular, House's (1975) path-goal theory of leadership is well-known in contingency theory. House also characterized four seperate styles: straightforward, encouraging, committed, and performance-oriented. The particular styles corresponded to states that were consistent with environmental factors.

Bass (1990) has investigated the transactional and transformational theories. The theories focus on two specific leadership styles. Transactional leadership focuses on rewarding the employee when organizational goals are met. When goals are not met as planned, the leader

makes adjustments. In transformational leadership, the leader keeps an eye on developing a vision, with the leader inspiring employees to achieve goals related to that vision. In addition, the leader advocates for employees and encourages them intellectually.

There is also the theory of emotional intelligence, which was developed in the late 19th century. Daniel Goleman researched it. This theory reflects the ability to manage oneself and figure out how to direct oneself. To be able to manage employees as a leader as follows (Goleman, 2018). The focus is on the following areas:

- Self-awareness: Knowing your own strengths and weaknesses and understanding your impact on others.
- Self-Regulation: Managing disorganized moods.
- Motivation: Enjoying your own achievement.
- Empathy: Understanding the emotional sense of people.
- Social skills: Developing a rapport to guide others in the right direction.

The theory of authentic leadership emerged in the early 20th century and continues to evolve today. Bill George's (2003) theory assumes that leaders themselves play a role in achieving success. In addition, there are specific leadership skills, but in the basics, the focus is on being oneself in order to adapt the skills. In addition, authentic leadership has similarities to servant leadership. For example, leaders' efforts to put the needs of team members first. As well as the leader listening to team members.

2.2.1 Leadership styles

As there are different theories of leadership, there are also different methods of categorizing leadership styles. Different orders of leadership styles are presented below. During the time when contingency theory was in demand, Bass (1981) elaborated two leadership styles that are applicable in different states. This involved **task-oriented and participative leaders.**
Task-oriented leaders used a directive approach with a controlled design. Then there are the participative leaders who focus on effectiveness through interpersonal connections.

Bass (1990) has compiled two leadership styles, namely: **transformational and transactional leadership style**. We see a connection with contingency theory, in which the transactional leadership style corresponds to a task-oriented leadership style. This is because both styles use goal setting with supervisory elements. Similarly, the transformational leadership style is related to the participative leadership style. This has to do with the fact that both are responsible for creating interpersonal bonds.
In contrast, Bass has deeply evolved leadership styles and as a transactional leader uses additions such as motivating employees by giving them rewards. While a transformational leader creates a vision.

Frame (2003) also developed four leadership styles based on behavioral theory. Turner used the following three variables for this purpose:
Employee participation in **decision-making, decision-taking and flexibility**. Linking the results of the manager determines which style they use. Figure 6 shows a table in which the four leadership styles emerge based on the results of the variables.

Parameter	Laissez-faire	Democratic	Autocratic	Bureaucratic
Team decision-making	High	High	Low	Low
Team decision-taking	High	Low	Low	Low
Flexibility	High	High	High	Low

Figure 6 Four Leadership styles by Turner & Müller (2012)

For example, if we look at a leader with an autocratic leadership style, we see that the leader has a low level of participation in decision making, but is very flexible. With a democratic leadership style, we see that the leader has a high level of participation in decision making, a low level of actual participation in decision making, but is very flexible.
In addition, Goleman (2018) made a different classification of leadership styles. He identified 6 leadership styles, which can be seen in Figure 7.

Figure 7 Six leadership styles by Goleman (2018)

Firstly, we have the **commanding leadership style** also known as coercive which has you do what I say mentality. This can be useful when the leader is dealing with difficult employees. On the other hand, this style has a adverse impact on the resilience of the company and impact on the ambition of employees. In addition, there is the **pacesetting leader** who cares about achieving high results through results and positive influence. Given the hierarchy, this leader is equal to the employees. In addition, we have the **visionary leadership style** who wields the follow me. It is not helpful when the leader works directly with employees who have more experience than the leader. In addition, there is a **coaching leadership style** who establishes similarities in the training of the employees, this leadership style shows similarities with the transformational and participative leadership style. It is an advantage when the employees are aware of their weaknesses, so that they can develop further. We also have the **affiliate leader**, who finds it important that the employees have a priority. This improves the team. In contrast, errors can arise that are overlooked and unrecoverable. Finally, the **democratic leadership style**, most efficient structure is chosen for employees to make targeted choices. However, this can also lead to indefinitely long meetings, without making a real choice.

Müller and Turner (2010) divided three categories into which authentic leadership could be divided. These composite classes are equivalent to the leadership style:

- **Goal-focused:** The leader has the responsibility in which direction the employees focus and formalizes the goals. In addition, the leader bears the responsibility for the qualitative result to be achieved.
- **Involvement:** The spearhead is less on the manager, the employees determine the direction themselves, whereby they determine how the result is achieved.
- **Engaging:** The leader places more emphasis on employee development than his own or company direction. The leader provides the handles and determines the goals in agreement with the employees.

When we look back at the different leadership styles, we find that there are commonalities. To get a clear picture of the comparisons, a compilation has been made in Table 1. Turner's (1999) variables were used to provide a formation of the styles together. A low rate equals a low rate on the variables.

Table 1: Comparison between leadership styles

	Bass (1981)	Bass (1990)	Frame (2003)	Goleman (2017)	Müller and Turner (2010)
Low				Commanding	
	Task-oriented	Transactional	Bureaucratic	Pacesetting	Goal-oriented
			Autocratic		
				Visionary	Involvement
	Participative	Transformational		Affiliative	
				Coaching	Engaging
			Democratic	Democratic	
High			Laissez-faire		

2.3 Relationship between leadership and open innovation behavior

For a company's employees to truly embrace open innovation, the company must have a strategic goal that inspires employees to achieve it. Think about the leadership style that managers use within the company, as this can influence the open innovation behaviors of employees. These are behaviors on a daily basis, such as communication between colleagues (Chesbrough et al., 2007). By applying the right leadership style, followers can develop an open innovation mindset in which employees work together to strive for the organization's open innovation goals.

Looking at the relationship between leadership style and individual open innovation behaviors, we see that there has been past research on transformational/participative leadership and the leader-employee relationship. As mentioned earlier, transformational leadership is thought to stimulate creativity (Shin et al., 2003). Transformational leaders encourage their employees to seek new methods to solve problems, where the leader helps the employee develop into a perfect person. At the same time, they ensure that employee creativity is stimulated. Sosik et al. (1998) used electronic brainstorming conditions in a laboratory study examining the effects of high and low levels of transformational leadership on group creativity. They also saw a positive impact of transformational leadership on employee creativity.

To expand on this, Nemanich et al. (2007) conducted a field study in which transformational leadership had a positive effect on employee creativity. This includes participative leadership where various activities such as consultation, decision making, and delegation are accepted. Most studies that focus on the role of leadership in developing creativity pay little attention to the role of leaders in the workforce with respect to implementing innovation.
Therefore, in what follows, we examine how leaders within the organization stimulate employees' open innovation behavior.

2.4 Research objective

Nowadays, open innovation is becoming increasingly important in companies. Significantly more companies want to acquire information from external relationships. The direct change in corporate goals raises the question of individual and organizational class. Therefore, it is important to learn more about how leaders within the organization can encourage employees to participate more in open innovation. It has been shown that leadership styles can optimize knowledge flow and improve employee open innovation behavior. According to Shin et al. (2003) transformational/participative leadership style has a strong effect on employees' innovative behavior because it facilitates knowledge sharing. In addition, Nemanich et al. (2007) confirmed the positive effects of transformational leadership on innovative behavior. However, most studies have focused on the leader's role in developing creativity, while there has been limited research on the leader's role in open innovation behavior related to idea integration. Therefore, the research objective of this study is also to take stock of leader behaviors that can develop employees' open innovation behaviors, including both obtaining ideas from external sources and idea integration behaviors.

2.5 Research questions

The main research question is presented below:
How can leaders foster employees' open innovation behaviors in the context of IT organizations?

Sub-questions:

1)What is the most commonly used leadership style within IT organizations in the Netherlands?

2)What specific characteristics should leaders possess for open innovation?

3)How can specific leadership behaviors lead to employees' open innovation behaviors, in terms of obtaining ideas from external sources and idea integration?

2.6 Research Model

This study examines how leadership styles influence employee behaviors related to open innovation. Leaders can improve idea generation and implementation through a particular leadership style. Therefore, it is important to use this research to investigate an appropriate leadership style that improves employees' open innovation behaviors during the phase of obtaining ideas from externals sources and idea integration. Thus, this research provides a new view of leadership behavior that improves employees' open innovation behavior in an organization. It addresses leadership behaviors that influence employee characteristics that lead to the development of an organization's open innovation success. An overview can be seen in Figure 8.

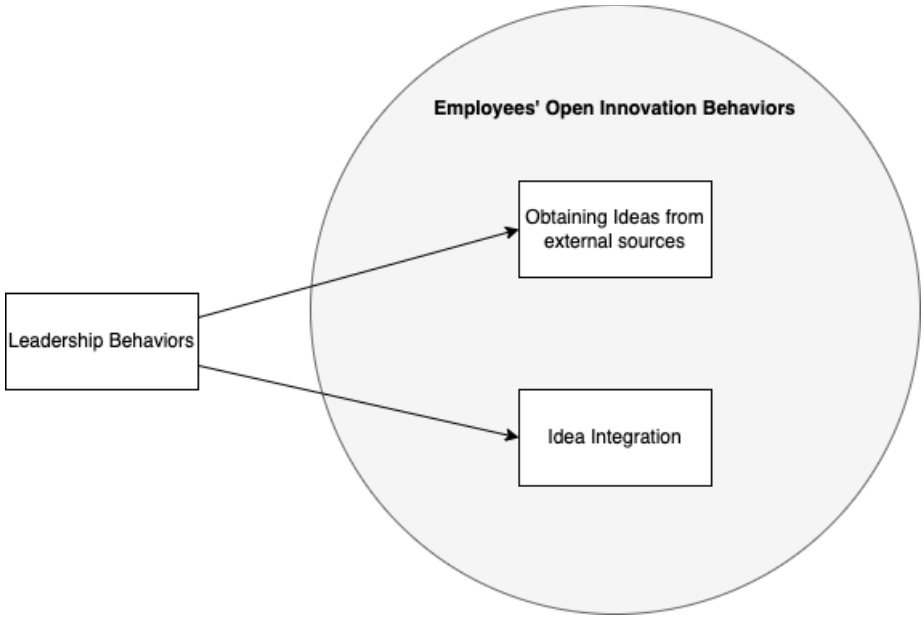

Figure 8 Conceptual Framework

3 Research Methodology

First, it is helpful to begin an exploratory study with a general idea of leadership and open innovation, examining specific leadership styles and their effect on individuals to optimize open innovation behaviors. It is useful to interview leadership management experts from different companies. It is also important that interviewees have different specializations within leadership. In addition, in-depth interviews need to be conducted to discuss activities that will ensure that open innovation is addressed and potentially improve employee behavior (Kendall, 2008). The in-depth, one-on-one interview allows questions to be asked and both social and personal issues to be addressed comprehensively. Conducting multiple interviews allows the interviewer to gain a broader range of knowledge, but the public nature of the method prevents them from delving into one person personally (Chirban, 1996). For example, you may choose to use a semi-structured interview questionnaire. Interviews are an excellent way to learn more about others' lifestyles, but it is sometimes difficult to gain an accurate understanding and insight. In addition, a pre-planned interview should be conducted accurately to obtain a rich data set (Bowling, 2005; Opdenakker, 2006). Similarly, the interviewer should use a funneling method in which general questions about leadership are asked of specific individuals who hold a specific leadership role within an organization.

3.1 Research approach

Semi-structured interviews were conducted for this research. The questions prepared in advance can be found in Appendix A. Six leadership experts and six employees from different areas in the Netherlands were selected for this purpose. The leaders and employees have a vertical dyad linkage, in which the leader has a relationship with the subordinate employee of the same organization. This was chosen because the leaders have insight into the nature of the relationship with the employee and what expertise this employee brings to the team. The platform MS Teams was used to conduct the interviews remotely. The aim is to use the interviews to show the influence of leadership styles on behavior in open innovation based on the narratives of the participants. Due to the semi-structured nature of the interview, it was possible to take a more discursive approach. Notes were taken during data collection and, when agreed, voice was also recorded.

3.1.1 Data collection

A total of 12 interviews were conducted with different participants. Experience varied from 12 months to 30 years with the organization where the participant works. Of the 12 interviews, 2 participants were female, and 10 participants were male. The staff consisted of managers and employees who received direct guidance from managers. The participants each had different levels of authority and responsibility. Some managers were commercially responsible for multiple corporate clients. Others focused on the day-to-day management of digitization projects with an eye toward work and product specifications and planning. Table 1 provides an overview with further information from the interviewees.

Table 2: Participants information

Participant #	Expertise	Gender	Tenure	Industry
L1	Campaign Manager	Male	17 years	Marketing Technology
E1	Campaign Engineer	Female	6 years	Marketing Technology
L2	Campaign Manager	Male	12,5 years	Marketing Technology
E2	Campaign Engineer	Female	2 years	Marketing Technology
L3	Senior IT Project Manager	Male	20 years	Technology service
E3	Software Engineer	Male	6 years	Technology service
L4	IT Project Manager	Male	5 years	Technology service
E4	IT developer	Male	11 months	Technology service
L5	Senior Project Manager	Male	27 years	Telecommunication
E5	IT architect	Male	16 years	Telecommunication
L6	Senior Project Manager	Male	30 years	Telecommunication
E6	Senior IT architect	Male	17 years	Telecommunication

This means that the amount of experience and expertise varies. In addition, the respondent provided insight into excellence at various stages of the leadership or employee journey within the organization. In addition, participants looked at past experiences, which allowed for more interpretation of the matter. Each interview took approximately 45 minutes and was documented on a voice recorder and annotated with important notes. Before the interviews were actually conducted, a total of five managers and five employees were contacted directly, of which four managers and four employees agreed to be interviewed. In addition, interviews were conducted with two managers and two employees through the interviewers' professional network. This resulted in a response rate of 85.7%. Of those interviewed, 8.33% have been with the organization for less than one year. 33.33% have been with the

organization between 2 and 10 years, 41.67% have been with the organization between 10 and 20 years, and 16.67% have been with the organization for more than 20 years.

The respondents come from three organizations belonging to different industries: Technology Services (4 respondents), Telecommunications (4 respondents), and Marketing Technology (4 respondents). It was decided to use different industries to get a broader overview and gather more information on this topic. Each company falls into the category of multinationals with multiple offices around the world.

It was decided to use different industries for a broader view and to gather more information on the subject. These industries were chosen because specifically these organizations face a widespread trend that uses external capabilities and knowledge sources to broaden knowledge boundaries.

Before starting the interview, the ethical considerations were first made. Consent was obtained for the voice recording of the participants. All interviews are accompanied by a consent form signed by the interviewee. GDPR guidelines were used for this, which refer to the anonymous provision of the participant in the research.

First, questions were formulated specifically for the leaders and for the employees, see appendix A. During the interview, questions were first asked about the role of the interviewee within the company and the duration of their role within the company. In addition, questions were asked about the leadership styles that they believe are conducive to open innovation.

In addition, more focus was placed on the characteristics of leadership behaviors, with the respondent citing the best leadership style to enhance open innovation in an organization. In addition, the leader was asked how a leadership style affects the behavior of the employees reporting to him or her and what characteristics it has. All responses to the questions were specific to the organization's open innovation activities. In addition, employees reporting to this leader were asked about the leader's behaviors that promote open innovation. Finally, a link was made between the leadership behaviors and the employees' open innovation behaviors.

4 Results

Kerlinger (1986) defines content analysis as a method to examine communication in an orderly, objective, and effective way to measure parameters. Saldaña (2021, p. 15) suggests that *''a theme can be an outcome of coding, categorization or analytic reflection''*. The chosen theme is leadership styles. This theme is coded by the identification of explicit words and phrases. Data reduction was used to analyze the qualitative data. The formula "from codes and categories to theory" (Saldaña 2021, p. 4) was used to code, categorize, and select the textual data. The interviews were based on a content analysis, that used an approach which examine the current status of concepts such as specific words within a unit of analysis. As follows, the explicit data has been elucidated by coding. The data is coded into content categories - leadership behavior and open innovation behaviors (employees). As an example of the leadership styles, characteristics have been highlighted such as: Openness to new thinking, commitment to actively listen to others. This was done in order to come up to the transformational leadership style. As follows, selective coding has been used to target the number of specific codes and characteristic words and phenomena that can answer the research questions on the theme of gradation.

4.1 Leadership styles

With regard to the focus group leaders, the leadership styles that they use within their organization were examined. Figure 9 provides an overview of the leadership styles used by the leaders who participated in the interviews.

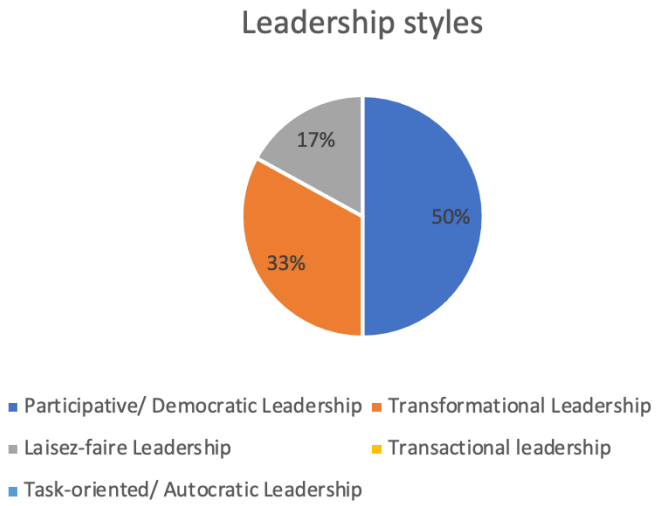

Figure 9: Participants' Leadership styles

On the basis of the parameters (team decision-making, team decision-taking and flexibility) of Turner and Muller (2012) the leadership styles were conceptualized at high - low, after which table 1 is shown and the differences in the series of leadership styles are discussed. Fifty percent of participants reported using a participative/democratic leadership style to guide employees in their daily practice. This leadership style was most commonly used because participants indicated that they involve employees in decision making. *''I always try to include knowledgeable members in decision making, because they have more knowledge than I do''. (L4)*

In addition, leaders make employees feel part of the organization and that their results are valued. There is a high level of trust in employees, and this motivates employees to contribute meaningfully to organizational goals. Likewise, leaders indicate that employees see themselves as part of the organization and seek to promote the growth of the organization.

However, 33% of participants indicate that they use a transformational leadership style within their team. In this case, the leader considers all stakeholders within the project. In addition, he encourages his employees to grow professionally and personally. *''I try to guide my employees and make them aware of their value and where they can develop further ''. (L6)*

In addition, leaders focus on decisions related to organizational performance. In addition, 17 percent of participants use the laissez-faire leadership style. This is because the manager gives employees freedom and flexibility with little or no supervision because employees are trusted to work in a solution-oriented manner.

4.2 Bottlenecks related to the leadership styles

Based on the feedback from the interviews, the following bottlenecks emerged related to the current leadership style of the leaders. Specifically, three aspects emerge: little basis for transparency, high time pressure and lack of support.

Little basis for transparency

A large part of the participants indicated that little transparency is clearly mentioned. This mainly concerns when an idea has been collected externally and people have no idea what happens to the idea once the idea has been submitted to the leader. This ensures that employees are less motivated to collect new knowledge. *“I notice primarily that there is a lack*

of transparency. This applies to both me and the employee. Often, I don't know what's going on, on the floor. I constantly have to ask what is happening, otherwise I will not receive any information" (L2) As well, another leader affirms that: *"What's going on in our office is like a large Blackbox. Work is being done, but I have no idea what really happens in the black box." (L1)*

There is little feedback here, and that goes both ways, for the employee and for the leader. The employee does not receive feedback on an idea that was reported to the leader, with confirmation of what was implemented, but neither does the leader, who does not indicate whether he or she has already had time to work on integrating the idea. Leaders also believe that a platform should be used to improve two-way communication: *"Having a conversation is crucial, the organization must use a platform that is transparent to all employees within the organization" (E4)*

In addition, a few indicated to use a Trello board to monitor the status of ideas. This allows goals to be managed and productivity to be increased. *"It would be helpful if we could use a Trello board, which syncs up to date. This gives you an overview of what still needs to be picked up by the leader, or how far an idea has already been developed." (E1)*

An employee with considerable experience indicates that leaders need to be trained on how to deal with ideas acquired from external companies in order to promote open innovation activities. *''It seems important to me that leaders be educated on how to manage open innovation activities. Unfortunately, I often have the idea that the leaders actually have no idea how to deal with idea integration, when an employee enthusiastically comes to him/her with an idea." (E6)*

High time pressure

In addition, time pressure was mapped for bottlenecks. Specifically, the time it takes employees to complete open innovation activities. But also the time needed by the leader to process the ideas in the integration phase. In addition, leaders indicate that employees approach them even for small things and therefore underestimate the time required. *"It's not nice if you are approached by all employees and are constantly addressed about hundreds of small things that I have to think about." (L1)*

This makes it more difficult to take the time to engage with ideas. It also shows employees that they sometimes need support to think about the idea together. Although managers can be approached for this, employees often tend to turn to their direct colleagues. But they often do not have time because their own activities are then put on hold. *''I am more often inclined to first approach my colleague before I present an idea to my supervisor. When I schedule an hour-long meeting, it often happens that this meeting runs late, and my colleague has to take work home because we have gone on for far too long. As a result, I notice that colleagues are more reserved when it comes to planning a brainstorm session, in order to prevent them from ending up in an unmanageable level of effort." (E2)* Employees feel that there is a continuous pressure of time, and they cannot neglect their own duties. *''It's not always easy to both help others and complete your own work, it just piles up. Sometimes I have an overflowing mailbox, because I simply don't have time to respond, otherwise my leader will ask again: How far are you with what I asked you to do?''. (E5)*

Lack of support

Some employees experience a lack of support from their leaders for rethinking the idea. Often the leaders feel that the idea is not clear enough and the leader is often too busy with all kinds of other things, for which the employee does not want to disturb them.*'' if you have a problem or you get stuck come to me then.''(L4)* On the other hand, an employee indicates something else: *''When I have an idea and I want to communicate it to my leader, I first think about whether I should do it. I am often less inclined to express an idea because I see that my leader is busy and often comes across as stressed''. (E2)*

In addition, it is also suggested that when external knowledge is collected, and this is discussed with the leader. The employees experience that they have not been fully heard because they are not provided with complete information and are not explained enough. *"Because there are often few contact moments, I notice that there is little support from the leader, while that may not be the intention." (E2)* The Employee-leader relationship is also missing by giving compliments and expressing appreciation for the effort the employee has made. *''I notice that I more often communicate high expectations to the employees, but I notice that I fall short in emphatically rewarding open innovation behavior of the employees socially.'' (L3)* It is important that leaders should be less soft and have to go through with it when asked to do so

and provide employees with instruments, so that they become motivated to achieve the mission and vision of the organization.

4.3 Employees' Open Innovation Behaviors

Open innovation behavior is defined as the behavior during the open innovation process that is necessary to collect external ideas and knowledge for the organization. Open innovation behavior can be seen as an overarching construction in which all behaviors are determined, this ensures that employees can contribute to the open innovation process.

Open innovation behavior related to the open innovation process, we specifically look at two dimensions: Obtaining ideas from external sources and integrating these ideas within the organization.

Table 3 Employees' Open Innovation Behaviors

Open Innovation Behaviors		**Participants with common relationship**		
Obtaining ideas from external sources	**Idea Integration**	**Obtaining ideas from external sources**	**Idea Integration**	**Percentage of positive responses (%)**
Extra-role behavior	Enthusing and convincing to ask for support	9	9	75
Connectedness	Consistent introduction of new ideas	10	10	83,33

The dimension of obtaining ideas from external sources focuses on the extent to which an employee recognizes opportunities and problems that need to be solved. After which the employee takes the initiative to enter discussions with external parties to collect information. Then combine this information to convert it into clear ideas. It emerged from the interviews that the following behaviors belong to open innovation behaviors:

Extra-role behavior, looking at voluntarily paying attention to issues that do not belong to the daily work of the employee. One of the employees indicated that *''I sometimes wonder out of curiosity how certain things work, to improve them''. (E4)*

This also involves identifying real problems and generating solutions through **connectedness** with external parties, such as a supplier. Another employee suggests: ''*By talking to a supplier and exchanging ideas about a certain internal problem, we find a way to find a solution together''. (E1)*

The Dimension of integrating ideas within the organization focuses on the capacity of the employee to find support for open innovation, by passing ideas on to the leader. Emphasis is placed on the benefits of the idea. It also takes into account how to ensure that the idea is integrated into the day-to-day running of the organization. The following open innovation behaviors emerged from the interviews:

Making employees and leaders enthusiastic with the new idea. This involves **enthusing and convincing to ask for support** from the leaders. One of the employees stated that *''I like to talk to a leader when I have acquired a new idea from an external relationship. I'm trying to express confidence in the idea in order to get support from my leader." (E2)* This also includes the **consistent introduction of ideas** by the employee and a contribution is made to the integration of new ideas within the organization. One of the employees indicated that: *''I try to make an effort from my own initiative to develop new ideas or improve current procedures'' (E5)*

The open innovation process perceived by the leaders and employees is seen as the extent to which employees believe that the activities for collecting ideas from external sources and integrating the ideas within the organization are incorporated. This research has shown that the personal relationships of organizations have become stronger during the COVID-19 pandemic. The staff of the organizations came together to make progress and change. The organizations took a connected approach to deal with the pandemic. The employees confirm this, such as *employee 4:*
"People I've never met before and who I don't normally get to deal with have changed course due to the COVID-19 pandemic. We help each other to share ideas and expertise."

4.4 Leadership behavior that fosters outside-in open innovation

After interviewing managers and employees, specific leadership behaviors were identified that lead to improvements in open innovation. Table 4 lists the leadership behaviors that lead to the improvement of obtaining ideas from external sources for an organization. Table 5 lists the leadership behaviors that improve the integration of ideas. This paper discusses how leadership behaviors affect employees' ability to participate in open innovation activities. Interview participants were asked which leadership behaviors make a positive contribution to improving open innovation.

4.4.1 Leadership behavior that fosters obtained ideas from external sources

Based on the subdivided groups (managers and employees), it is possible to distinguish different leadership behaviors and to encourage employees in terms of obtaining ideas from external sources. Since this is a qualitative study, this section focuses on the behaviors that are most important. Therefore, not all aspects are considered in the following.

Table 4: Leadership Behavior that fosters obtaining ideas from external sources

Leadership behavior	Participants with common relationship	Percentage of common responses (%)
Motivating the employees	9	75
Encouraging open-mindedness	9	75
Improving information sharing	9	75
Providing autonomy and delegation	9	75
The distribution of onerous assignments	6	50
Stimulating knowledge diffusion	6	50
Intellectual stimulation	4	33,33
Empowerment and self-awareness	4	33,33

Based on the above analysis, a specific look has been taken on the characteristics that have a better relation to open innovation. These leadership behaviors were further examined in detail based on the interviews:

- Motivating the employees
- Encouraging open-mindedness
- Improving information sharing
- Providing autonomy and delegation

Motivating the employees:

Several employees have problems when talking about new innovative ideas coming from outside the company. This is confirmed by direct leaders. They state that there is a desire for guidance and tools to keep employees motivated: *''It is important that not only the employees but also the leaders are given the time, otherwise it is not possible to take further innovative steps''. (E3)*

As well as various employees bring with them that it is important to offer a vision. As this is extremely important to stay motivated. The leader must communicate their views and emotions with regard to open innovation to the employees. *''I adopt a vision for the future as a plan to improve a product or technology, my enthusiastic attitude about the future motivates the employees and this triggers the employees to ask curious questions.'' (L3)* Contrarily, the employees lack their interest in applying outside-in open innovation, because this is not encouraged by the leaders. Employees become motivated when they notice that leaders are embracing external ideas of the employees: *"If you find yourself in your room in the middle of the night and struggle to find your phone to see what time it is and you cannot find your phone, you will stop searching at a certain point''. (E5)*

In addition, the employees not only indicate that the communication of the leader is important, but likewise the environment where the employees want to disclose a certain idea. Not every employee has the same amount of interest in gathering external ideas and wanting to be continuously innovative. This makes it difficult for employees who are interested and want to ask further questions or express an external idea: *''When we have a team meeting every two weeks on Friday afternoon. After which the manager goes through all the agenda items and then asks the question, are there still other aspects that we would like to mention?*

But I notice at that moment that the meeting took so long that I think, we've had a long day, I don't want to make it later than it already is. I'd like to go home, so I'd rather keep it to myself." (E5)

Encouraging open-mindedness

There are several approaches to encouraging open innovation. Remember to give employees space and time to consider innovative ideas from suppliers, customers and exhibitions. However, it is critical that as a leader, you are open-minded by acknowledging when employees bring up an idea and offering tools for employees to put those ideas into practice. Therefore, as a leader, it is important to communicate and maintain an open mind with employees. One of the leaders confirmed this as follows: *''I approve open innovation, by working with me, I observe and say we should solve it together. You may find a way out, in most cases there is a solution''* (L6)

It also emerged that, in addition to their work, employees also need to have time left to contact external parties in order to reconsider processes. Providing time to drive open innovation behavior is critical, according to leaders:

''I think it's important to offer my employees time, when I'm looking for a solution, I keep in mind that time must be made available to the employee to carry out open innovation activities in addition to their work. If I have the expectation that the employee must carry out both their work and open innovation activities, in reality no open innovation will be realized." (L5) Some employees indicate that this ''extra time'' is not given by the leaders, this makes it difficult to collect new ideas from external sources. In addition, the pressure to deliver output before a deadline comes and this creates a time constraint. The employees have limited time to communicate an idea with their leader.

Improving information sharing

It is important to disseminate information within the organization. From the employee's point of view, we see that when employees are involved and collaborate, information is disseminated. *"When we work together both internally and with external partnerships, information can easily be shared with each other." (E4)*

Building on this, leaders believe it is important to organize meetings (more often) in order to show understanding of the ideas that the employees have. The leaders feel that the employees are not given enough space to present an idea, that the leader can embrace the idea and possibly offer practical tools: *''For example, think of an employee who is enthusiastic about an idea, he/she has worked this out completely in his head, and then I have to assess this idea, while I have little to no idea what the employee actually wants. In addition, I have limited space to have a meeting with this employee. ''* (L1)

By giving the employees the space and scheduling meetings with them to exchange ideas, a contribution can be made to gaining an understanding in order to clarify a solution to a problem.

Providing autonomy and delegation

By delegating certain tasks as a leader, you can offer employees autonomy to a certain degree. A leader believes that autonomy is important, and time limits can make a positive contribution to open innovation behavior: *''I am aware, and I notice in practice that open innovation is stimulated when employees receive time-bound limits, you do not receive this extra salary, but would like to look at this before date X and possibly come up with a solution for this''. (L2)*

Another leader also confirmed that delegation can improve open innovation. Where the employees within the organization do not get enough freedom to search for solutions to problems themselves and to have autonomy to express open innovation behavior themselves: *''From my point of view, having a valid amount of autonomy and offering employees the space and freedom to think for themselves. Instead of me thinking for him or her. Every now and then it is useful to think for the employee, but up to a point. The employee must carry out his work himself and let the employee find a way out on the basis of experience.'' (L1)*

In addition, another leader also suggests that: *When you map out goals and specifically don't tell the employees how you can achieve this goal, you offer the employee room to let their brain work''. (L2)*

4.4.2 Leadership behavior that fosters idea integration

Table 5: Leadership Behavior that fosters idea integration

Leadership behavior	Participants with common relationship	Percentage of common responses (%)
Implementing a feedback culture	10	83,33
Enthusiasm to integrate better solutions	10	83,33
Providing resources	9	75
Providing financial rewards	6	50
Recognition for open innovation activities	6	50
Monitoring effectiveness and efficiency	5	41,60
Example Innovative role modeling	5	41,60

Based on the above analysis, a specific look has been taken on the characteristics that have a better relation to open innovation. These leadership behaviors have been further explored in detail:

- Implementing a feedback culture
- Enthusiasm to integrate better solutions
- Providing resources

Implementing a feedback culture

Leaders find it important to have a feedback culture because it is essential for employee communication. In doing so, the leader should take time to provide feedback to the employee, especially if an idea is not integrated. This will prevent the employee from getting bored and looking for new ideas. The employee will still come up with something new next time. *''It is important to start a conversation with the employee and to take the time to do this. This ensures a discharge of the inner energy. Feedback is provided to the employee, even when the idea is not integrated within the organization. This provides understanding and awareness of why the idea is not integrated. If you don't give feedback, the employee will not be so inclined to come up with new ideas''. (L3)*

By actively listening and asking for an explanation, you can provide qualitative feedback. At the same time, this also conveys the feeling that the employees have been heard. Even if the idea is not put into practice, employees are motivated to come up with new ideas in the future: *''I notice that when a short feedback loop is held, the employees get motivated to approach me and ask for help, so it is important to give feedback''. (L2)*

While leaders know it's important to provide feedback, being consistently available to employees to discuss ideas involves some level of stress. This can have a negative effect on the employee, which is confirmed by: *''When you as a leader have to deal with a crowded agenda and then the employee comes by to discuss an idea, I think inside this has been worked out. But really, I say, don't worry, I can't focus on this today. I'll write it down and get back to it later'' (L1)*

The leaders feel that they provide some measure of feedback. However, the employees do not experience this, and they see that the feedback is not structured. The employees experience that the ideas are not desired and that they want to distract the leader as little as possible with their work. Moreover, after the ideas have been collected and shared, it seems that there is little communication for further steps. *''Within the team, external ideas are occasionally suggested, with the employees expressing their views on this. The views are only given from the team level. But after that, the real integration within the organization is still far from the vision''. (E1)*

Enthusiasm to integrate better solutions

Leaders can demonstrate in a variety of ways that they support new ideas and eventually integrate them. One of the leaders states that he shows his presence in the department by walking through the employees' work environment and asking them if they are stuck on a solution. This is hindered by an online work environment. By making a compelling connection with employees, it can create a sense that employees are always welcome to share an idea: *''Establishing a good connection with an employee is necessary to achieve goals together. It is important to also show an interest in private related matters. This creates a trusting bond. This is also the situation I am currently in. As well as asking each other how they would work out certain issues. It is important to maintain consistent contact ''. (L2)*

In addition, there is also the fact that the leader has tasks, authorities and responsibilities that sometimes prove difficult to demonstrate support for open innovation than the expectations that the employees have: *''What I keep saying within the group, have you already worked out the idea on paper? Sometimes when I move from one meeting room to another, I am immediately approached by 2 or 3 employees, while I don't have time for it at that moment. At that time, this knowledge must be noted before it is lost. I then indicate to write this down, although it may sound stupid''. (L1)*

Supporting open innovation is not easy in most cases. Despite the lack of time, leaders can still provide support by formulating approaches for dealing with an employee who has an idea. If an employee knows that a leader prefers to work out an idea on paper, he or she can even contribute and imagine how the leader will simply understand the idea.

In addition, it was also considered that an employee indicated that there is a certain work culture and that there is no time to carry out open innovation activities. *''I have a feeling of restraint, because due to time constraints I finish my own responsibilities exactly on time and so there is hardly any time to start a conversation with my leader''. (E2)* This quote confirms that reluctant employees do not reveal as much motivation as employees who are fully supervised by the leader. When a leader draws the employee to him to discuss his issues, the idea integration process can be improved.

Providing resources for idea integration

It is important to note that developing an idea requires tools to integrate an idea into the organization. Employees that want to integrate a particular idea often do not have the necessary resources and tools. Therefore, it is important that leaders support the idea and provide the tools necessary to develop the idea. Some leaders feel the need for resources to support the employee's idea: *''Continuous contact with the employee stimulates, this does not always have to be in a formal setting, this can also be done by simply having lunch with the employee and such to share knowledge with each other." (L5)*

On the other hand, from the employee's point of view, there is a lack of cooperation and time to simply pass on innovations or ideas to the manager. As well as the leader experiences this too. When the leader has enough time to show leadership behavior that is important for

innovation, more employees would show open innovation behavior: *''I would like to work more closely with my colleagues. That sufficient time is made available and not just to carry out our direct tasks." (L1)*

4.5 Relationship between leadership behavior and OIB of employees

Open innovation behavior refers to the behaviors that are reflected by the employees in the form of actions during the open innovation process, in addition to their daily work. To ensure that open innovation behavior arises, all leaders believe that open innovation should be included in the leader's vision. *''Employees get motivated when I provide them with a long-term vision, in order to pursue the organizational goals''. (L3)*

When open innovation is integrated into business objectives, this can lead to open innovation activities being adopted in day-to-day operations. This ensures that an open innovation behavior is created among employees. According to DuBrin (2015), we see that a clear vision of an organization is related to leadership. Leadership ensures that individuals are influenced to achieve the organization's mission. To engage employees and create interest, employees should have the impression of benefit that encourages the employees to gather external ideas. This ultimately impacts employees' open innovation behavior.

All managers believe that the leadership behavior mentioned in the previous section promotes employees' open innovation behavior, which in turn benefits the outcome of open innovation in the company. To ensure that all employees are involved in open innovation activities, leaders can choose leadership behaviors that promote employees' open innovation behaviors.

The leadership behaviors described in the previous section can help increase employee engagement and collaboration, in both phases of the open innovation process. Motivating employees ensures that they want to acquire knowledge and then share it with others. Leaders need to communicate its vision and emotions about open innovation to employees. In addition, forming partnerships ensures that employees develop communication skills that ensure employees have the confidence to share the ideas and knowledge they have gathered. To ensure that open innovation behaviors emerge, the company must build a better relationship with its employees and provide motivation. Similarly, the relationship between manager and employee must be nurtured. Leaders must continually encourage employees to

work together with external relations to ensure that the organization better tolerates open innovation.

Leadership styles can be developed over time, with values being structured in practice. Therefore, it takes time to develop the impact of leadership behavior on employees' open innovation behavior, which will later lead to successful open innovation output. According to E4, the organization should guarantee the open innovation behavior. This allows employees to take risks without having to live with the fear that their contract will be terminated. Leaders should accept ideas from outside, with the leader being open to sharing ideas with employees. In addition, it is important to have confidence in employees and encourage them to facilitate open innovation activities.

The mindset of employees is influenced by leadership behavior. Today's organizational environment limits open innovation practices because employees feel they are not being involved. That has even led employees not wanting to communicate and share their knowledge. Leaders should facilitate employees to develop an active mindset where the leader guides the employee. Leadership behaviors help individuals on teams collaborate on organizational changes related to open innovation. All leaders should have a mission that leads to open innovation, where all leaders are connected to be open to external collaborations, which ensures successful organizational output.

Employees should be encouraged to seek new opportunities not only internally but also externally. This organizational change will be more difficult with old, complicated organizational structures. E6 postulates that feedback from leaders can contribute to employee engagement by validating their ideas. *''Leadership behavior related to employee engagement will take open innovation to the next level''*.
Leaders can choose to be more open to employees, with employees receiving a flexible attitude to collect and share ideas. From a leadership perspective, open innovation emphasizes a network of candidates who exchange knowledge in order to create mutually attractive links to help the organization develop new optimized processes.

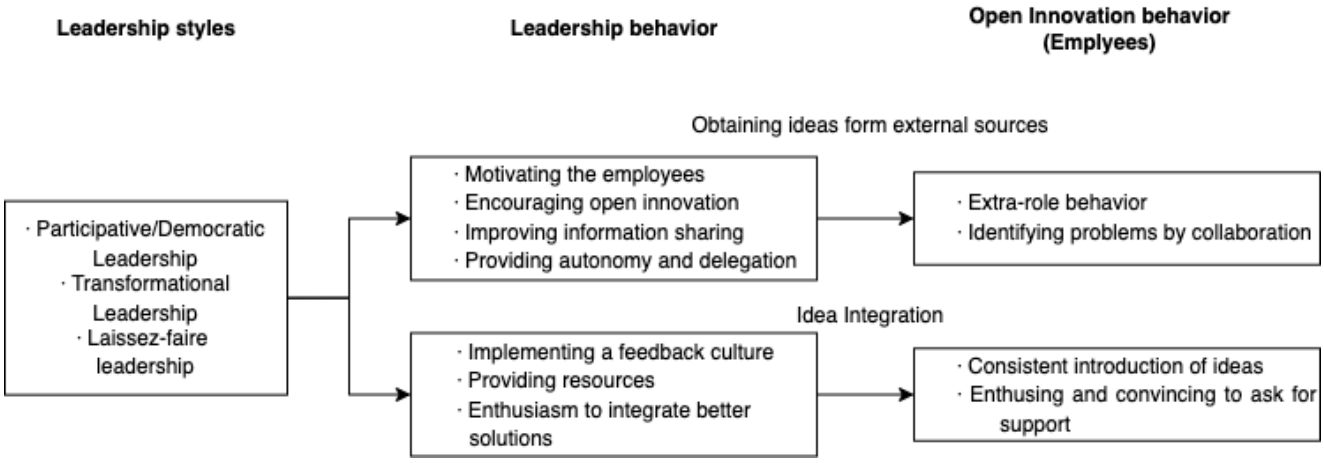

Figure 10 The relationship between Leadership Behavior and Open Innovation Behavior of employees

In addition, participant E3 confirms that an ''open'' organization in which the employees are involved in applying their open innovation behavior stimulates open innovation activities. Leadership style ensures two-way interaction between leaders and employees. The leadership behavior provides a characteristic quality of mutual exchange of experiences and ideas, creating favorable bonds. Day-to-day leadership behavior has the function of motivating employees to share ideas externally. This leads to an open organization where the staff sense flexibility and confidence to participate in idea sharing. To ensure that open innovation activities take place in an organization, leaders must be aware of the influential behavioral characteristics. Leadership behaviors can stimulate employees' open innovation behaviors, leading to organizational change related to open innovation. Figure 10 visually shows the relationship between leadership behavior and open innovation behavior of employees.

4.6 Relationship between LB, OIB and individual OI output

Organizational change has a top-down approach, where leaders must exhibit certain leadership behaviors to motivate the rest of the employees to engage in open innovation behaviors. This then helps to ensure that the company's open innovation goals are shared. Leadership behavior encourages employees to adopt an open mindset and engage in external collaborations. This means not only motivating employees to develop skills to keep up with new technologies, but also soliciting outside ideas and sharing those ideas with their leaders. This creates an open atmosphere within the company. The flexibility and ease with which employees can share their ideas with others and the and the feeling that they are involved are a crucial motive considering the open innovation process.

Leadership behavior has a moderating character in promoting leaders-employees' communication so that open innovation behavior is encouraged. If the communication between leaders and employees is improved, the output of open innovation in the organization will also be better. In addition, the collaboration between the leader and the employee will be strengthened through a short feedback loop. Having confidence in employees' abilities makes it easy for them to solicit and share external ideas. Employees' open innovation behavior should be encouraged to motivate them to adopt an open mindset. Leadership behavior influences the internal stimulation of employees. This ensures that employees are motivated to acquire knowledge and share that knowledge. It also ensures that leadership behavior influences open innovation behavior, with individual support for knowledge sharing coming from external relationships and also maintaining key relationships with organizations to contribute to effective relationships.

If organizations want to focus on open innovation activities, they need to learn new technologies or processes from potential external relationships. To properly implement open innovation in the organization, all leaders in the organization must exhibit appropriate leadership behaviors. In doing so, all leaders should motivate employees and monitor them in the background to give them credit for their commitment to the organization's goals. Leadership behaviors can change the thought process and bring out the value of an employee. Leadership behaviors can optimize employee engagement, ensuring that employees are

motivated to engage in external relationships. It is also important that leadership behaviors can ensure that skills, including employee communication skills, are encouraged to participate in open innovation activities. Employees must learn to maintain grievances with either the leader or the external party with whom a collaboration is entered into. Employees experience that an open attitude from the manager makes them feel listened to, acknowledged, and involved.

By applying the specific leadership behaviors, each individual's ability to develop is enhanced. If an organization wants to focus on open innovation, it can choose a specific leadership style. This research focuses specifically on applications of open innovation based on a two-level analysis: Employees and Leaders. It has been shown that leadership behavior has an impact on the skills of both leaders and employees. In addition, not only behaviors but also competencies are involved that are required for both the employee and the leader to realize a better open innovation output. Based on the insights of the interviewees, the following leaders/employees' competencies have emerged that are important for the open innovation process. Table 4 shows the required competencies of employees and leaders.

Table 1 Multi-level analysis: Open Innovation competencies

Leaders' Competencies	People Management
	Knowledge Sharing
	Open Mentality
	Risk Taking
Employees' Competencies	Knowledge Sourcing
	Knowledge Sharing
	Open Mentality
	Maintaining Relationship

Leadership behaviors of leaders evolve over time. This improves the open innovation skills of employees and leaders. Collaborative activities should be conducted on an ongoing basis to achieve better open innovation output. Leaders need to communicate openly and responsively with their employees to motivate and trust them to share external ideas internally. The outcome of open innovation in an organization can be measured by the output of each individual. This can show the individual activities of employees in the search for new ideas. Individual open innovation output can be determined to evaluate the organization's open innovation. Open innovation output is a goal set by leaders that applies to all employees

and depends on the organization's goals. This can be measured by the number of new ideas that come from outside the organization.

Leadership behaviors must be rooted in the organization's mission and vision for leaders to adopt these behaviors. In addition, leaders should keep an eye on employee output in the area of open innovation. To encourage this, leaders should reward them socially by giving them recognition and appreciation.

The amount can be compared to the organization's open innovation output. This can be achieved by tracking the yearly quantity of knowledge sources, collaborations and relationships. The organization can also determine whether R&D expenses have been reduced or time to first sale has been shortened.

Socially rewarding employees improves motivation on an individual basis, increasing the company's level of openness and thus the individual open innovation output. Collaboration tools can help maintain record of related activities to improve an organization's open innovation output.

Figure 11 shows that for an organization to achieve good open innovation output, it is important to embed this in the organization's mission and vision. This will ensure that leaders develop leadership behaviors that improve employees' open innovation behaviors. As open innovation behavior changes, this will motivate employees to engage in more open innovation activities. This will lead to an improvement in the organization's personal and therefore collective open innovation results.

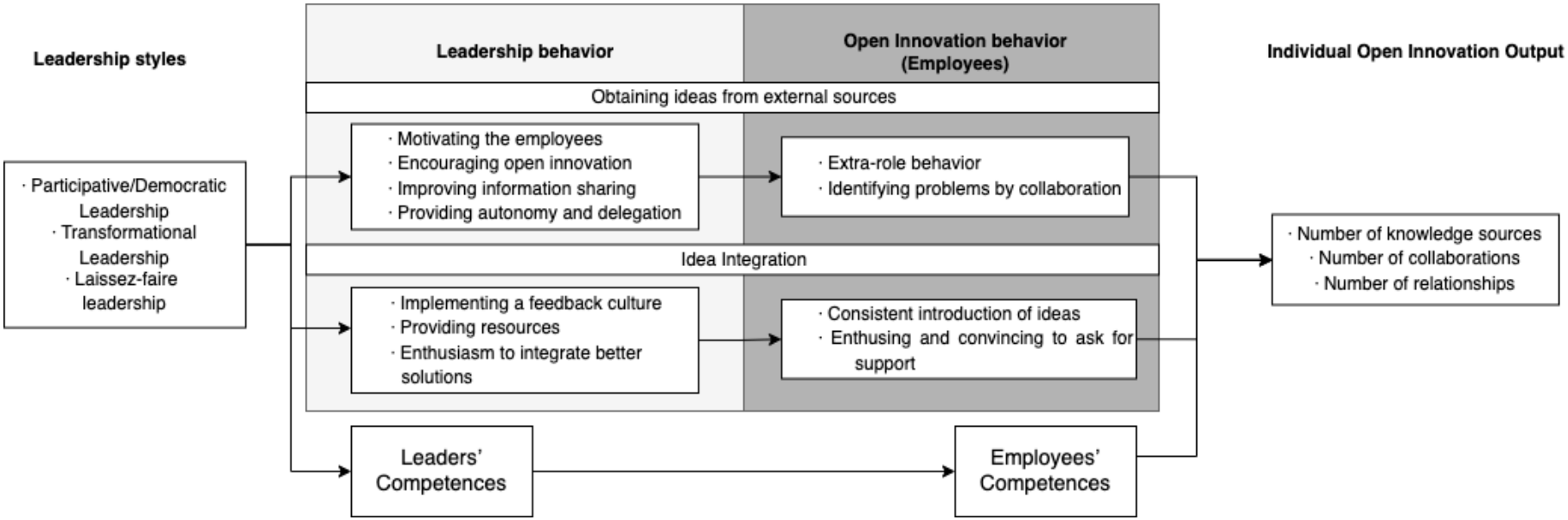

Figure 11 The relationship between Leadership behaviors, Open innovation behaviors and Individual Open innovation output

5 Discussion and theoretical implications

In the context of open innovation, it is important that the outer layer of organization is permeable. It is also important that knowledge must be generated not only internally, but also from external sources. With this thesis in mind, open innovation is defined as "the process of shared, reciprocal knowledge flow, with an emphasis on building and maintaining relationships to acquire a solid competitive advantage." The open innovation process perceived by the leaders and employees in this study is seen as the extent to which employees believe that the activities of gathering ideas from external sources and integrating the ideas within the organization are integrated to achieve organizational objectives. This research has shown that organizations' personal relationships have grown stronger in recent years despite the COVID-19 pandemic. When considering open innovation from a management perspective, employees are viewed as useful tools. Employee open innovation behavior is critical to participation in open innovation activities that ensure successful organizational open innovation output.

Fifty percent of the participants in this research indicated that they use a participative/democratic leadership style to direct employees in their daily practice. In addition, there have been two leaders who use a transformational leadership style and one who uses a laissez-faire leadership style to direct his subordinates. The research has shown that it is important to continue to motivate employees, adopt an open attitude, improve information sharing and provide autonomy and delegation are leadership behaviors that influence the open innovation behaviors of employees while obtaining ideas from external parties. Leadership behaviors motivate employees. It also leads to better internal and external collaboration of organizations. By improving relationships, knowledge can be shared and acquired, creating a mutual bond. When employees have more frequent contact with their leader, it leads to a knowledge advantage. Leaders can share knowledge and experiences with the employee to motivate them to gain knowledge outside the organization, such as customer relationships. The key leadership behaviors associated with integrating ideas emerging from research to drive open innovation behaviors of the employees are implementing a feedback culture, enthusiasm to integrate better solutions, and providing resources. By providing feedback within the organization as a leader, you ensure that employees develop the skills to

actively participate in open innovation activities. This means that employees form relationships based on social communication skills and maintain those relationships. In addition, it appears that leadership behaviors influence employee engagement so that employees are more inclined and stimulated to engage in open innovation activities. Some leadership behaviors have a direct impact on employee behaviors and capabilities, ultimately leading to successful open innovation output in the organization. Based on this study, a multi-level framework was developed for applying leadership behaviors that impact an organization's open innovation. The framework specifies leadership behaviors and how they influence open innovation behaviors of an employee to contribute to open innovation. This research has shown that leadership behaviors: Knowledge and skills can be developed to gather external knowledge and share it within the organization. As this development occurs within the organization, it will impact employee competencies to gather and share knowledge internally.

Leaders within the organization are tasked with improving employee behaviors, but the focus is on open innovation outside the organization where employees gather information to develop their skills. Research has shown that leaders advise integrating open innovation into organizational goals and motivating employees to share knowledge, gather outside the organization, and accept beneficial relationships with other organizations.

In addition, it is important that open innovation behavior of employees in an organization is determined by:

- Vision of open innovation. Leaders can shape how to implement open innovation in the organization, by communicating open innovation objectives to employees and providing them with a vision.
- Leadership behaviors that stimulate open innovation by motivating open innovation behavior of employees. The important bottlenecks that need to be improved are organizational transparency, more support and minimizing time pressure.
- Achieving an open innovation attitude, this ensures a change in the daily habits and mentality of the employees.

Embedding open innovation into the organization's mission can create a shared feeling among employees. This creates an environment with open communication, through which employees collectively acquire knowledge in order to enter into external relationships.

Leadership behaviors promote employee skills, optimizing open innovation output from employees and the organization as a whole. A vision of open innovation makes it possible for leaders to use leadership behaviors to optimize employee behaviors and competencies, thereby stimulating open innovation. This results in an impact on the communication between the leader and the employee. This results in organizational change and thus an improvement in the individual open innovation output and thus the joint organization open innovation output. Leadership behaviors have a direct impact on employees and the organization as a whole.

A contribution of this research comes in Participative leadership, confirming this among the leaders who participated in this research. This was consistent with Bass's (1981) research, which found that the leader informs and involves all team members in decisions and can provide input before a final decision is made. From theoretical literature, the relationship between leadership styles and open innovation is small. De Jong (2007) suggests that leadership behavior influences an employee's ability to innovate. In this paper, further research is conducted in this area. First, the leadership characteristics that influence employees' ability to improve open innovation were investigated.

According to Tuominen & Toivonen (2011), for open innovation to thrive, employees need to gather ideas from external sources and share these ideas within the organization to eventually integrate them. This can be encouraged through leadership behaviors. In addition, these behaviors have been shown to influence communication between employees and leaders within the organization (Chesbrough et al., 2007). Employee involvement can develop knowledge capacity while encouraging employees to build relationships. Continuous interaction between employees and leaders motivates employees to engage in open innovation behaviors. Leadership behavior can encourage employees and leaders themselves to actively implement open innovation activities. Second, leadership behavior can contribute to a company's success in open innovation. Open innovation needs to be part of the organization's mission and vision, so this contributes to the adoption of leadership behaviors that directly impact individual open innovation output. It is noted here that the results lead to organizational change in terms of employee behavioral alignment. The behaviors need to be applied every day: by both employees and leaders. These characteristics include sharing knowledge through internal communication and communicating with external relationships.

Giving employees the freedom and flexibility creates the motivation for open innovation behaviors. Since this is a major change, all employees in the organization must contribute to develop their own behaviors, which takes time but benefits the entire organization in the long run.

While Nemanich et al.'s (2007) research contributes to the literature on leadership styles that influence open innovation, this research focuses on identifying leadership behaviors that enable open communication and contribute to open innovation.

This research focuses on the characteristics of open innovation at the middle management level-managers and employees who fall under this level. Previous literature has focused on leadership influencing employee creativity (Shin et al., 2003), whereas this research focuses on leadership behaviors that encourage employees to gather and share information externally. his study adds value to the literature by identifying the leadership behaviors that ensure open innovation is embraced and by establishing the relationship between leadership behaviors and the output of open innovation in the organization.

6 Practical Implications

Based on previous literature, bottlenecks related to open innovation have been identified (Lam et al., 2021), but there is no specific research on how leadership behavior influences employees' open innovation behavior to improve an organization's open innovation output. Research has mapped leadership behaviors that have examined organizational capabilities to adopt open innovation. In addition, it is useful for HR to prepare a job description for leaders during a recruitment process that attracts leaders and, in addition to the daily tasks, that attention is also paid to which leadership behaviors are expected within the role related to open innovation. Although this research has the most common ground with the participative/democratic leadership style, there is in particular not 1 leadership style that can best be used within the open innovation process, this depends on the type of organization and the type of people to be managed.

Based on the analysis conducted, leadership behaviors were identified that can influence employees' open innovation behaviors so that employees individually acquire and share

external knowledge. These behaviors help leaders create an environment of open innovation. In particular, this is achieved by managing employee communication and behavior. This study can support leaders who want to achieve their business goals through open innovation. The study identifies leadership characteristics for employees. The competencies of leaders and employees that are critical to open innovation were captured, and leadership behaviors can influence employees' open innovation behaviors. It is important that organizations examine how certain leadership behaviors and open innovation behaviors are carried out within the organization, in order to see where the points of attention lie.

In addition, the report presented the connection between leadership behavior and employees' open innovation behavior and individuals' open innovation output. Leadership behavior plays a critical role in shaping organizational setting that provides and encourages open innovation within the organization. Leaders should motivate employees to engage vigorously in optimizing communication inside and outside the organization. Leaders can focus on individual contribution and improve collaboration for open innovation. Leaders should strengthen the relationship between them and employees. Leaders should conduct a short feedback loop with employees to motivate them and communicate potential (customer) relationships. This report is aimed at leaders in organizations who want to stimulate employees' open innovation activities.

One of the interviewees indicated that it is useful during the application procedure to specifically ask about the leadership style that the leader uses, *''what if you are asked about specific leadership behavior prior to the application process. ''* (L4) In addition, it is possible from the HR department to offer leaders training courses to stimulate specific leadership behavior. In addition, organizations can offer employees courses to stimulate open innovation behavior, for example, a communication course in which the employees can further develop their social communication skills.

7 Limitations and Future Research

This study confirms that there are limits. There is little literature that examines the relationship between leadership and open innovation. This work contributes to the literature by showing the relationship between leadership behavior, employee open innovation behavior, and individual open innovation output. Because there is little literature available, the results of this study can only be applied in this specific situation, making the results difficult to generalize.

In addition, there is a bias for social desirability, as it is difficult to ask a leader about the leadership style. The person concerned can mask himself/herself and present himself/herself in a favorable way.

However, there was a geographical limitation, as only organizations in the Netherlands were selected for this research. In order to focus on a specific dataset, information was collected from three companies in different business areas. Since the sample size was focused on 12 respondents in this study, there is a lot of variation in the results. Another limitation has to do with sample size, since the sample size is small makes it difficult to determine whether the outcome is a correct finding.

One possible suggestion is to see if there are other ways to measure the most commonly used leadership style. This is because the method is not the most optimal method to compare the different leadership styles and have the interviewee select one that corresponds to their leadership style.

Future research should examine leadership behaviors in the context of IT with large sample size, because only then can more leadership behaviors from different leaders be included to look at their relationships. As a result, an accurate estimate can be made, representativeness can be easily assessed, and the results can be generalized.

A qualitative/exploratory study was used for this study. The leadership behaviors captured are subject to the experiences of managers and employees at the middle management level

within organizations. However, there may be problems in implementing the leadership behavior because each organization has its own work environment. The constraints associated with the work environment may influence individual response. This master thesis is limited due to the lack of time. Extra comprehensive study can be aimed in order to show the influence for every leadership characteristic on open innovation behavior. The COVID -19 pandemic has played a role that the interviews took place in a virtual environment, so the social aspect was missing and not all questions could be observed to be asked further. This research has shown the correlations and assumes that leadership behavior can promote employees' open innovation behavior. However, the extent to which this is the case has not been tested.

8 Conclusion

For the purpose of the thesis, open innovation has been defined as *"the process of joint mutual knowledge flows, with the focus on building and maintaining relationships, to appropriate a better market position".* Open innovation facilitates the process to obtain ideas from external sources and integrating ideas within the organization. Organizations can achieve this by partnering in the area of research and development. The facilities and capacities should be parallel to the open innovation objective.

Facilities can be fiscal assets, but they can also be intangible assets. The intangible assets, such as knowledge and experience, are tactically critical because they provide an extraordinary competitive advantage for the organization.

Knowledge at the individual level is useful for collecting and sharing information. Organizations can use leadership to manage intangibles to achieve a successful outcome. This report has mapped Knowledge at the individual level is useful to gather and share information. Organizations can use leadership to manage intangibles to achieve a successful outcome. This report identified leadership behaviors that impact open innovation in the organization. Key improvements relate to reducing time pressure, improving transparency, and providing more support.

This ensures that employees develop behaviors necessary for open innovation. This primarily relates to open communication and collaboration between leaders and employees, as well as the employees themselves. This can be achieved when open innovation is incorporated into

the organization's mission and vision. Leadership behaviors foster the relationship between leaders and employees. In addition, these behaviors facilitate the sharing of ideas and the remediation of employee deficiencies by establishing and maintaining mutually beneficial relationships.

An organizational shift toward open innovation requires a change in behavior in day-to-day activities. Open innovation behaviors focus on improving innovative thinking, engaging in external relationships, and acquiring and sharing knowledge.

A variety of leadership and employee competencies influence the individuals' output of open innovation. The organization proceeds from individual open innovation activities to achieve organizational open innovation goals. Research has shown that leadership behaviors at the middle management level influence employee outcomes and organizational open innovation output. Open innovation can be shaped by incorporating leadership behaviors into the organization's mission and vision, open innovation behaviors, internal communications, and leadership support, leading to better individual outcomes that ultimately lead to better organizational open innovation output.

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Appendix A: Interview questions

With this interview we look at the various leadership behaviors that stimulate open innovation behavior of employees. This interview is used for the Master Thesis MoT. Your views related to this topic will be collected and analyzed and the result will be accessible to the TU Delft repository. The interview itself is recorded with a Dictaphone and is only accessible to me.

Group 1: Leaders

1. Tell me something about your working experience?
2. Could you please describe your current role in the organization?
3. How do you lead your team?
4. What are the qualities that a leader should have based on your view?
   Explanation Leadership styles:
   ''A leadership style looks at the characteristic behavior of a leader in order to influence the behavior of his employees to achieve a goal by directing, motivating and guiding employees. Leaders can motivate others to perform optimally and innovate.''
5. Based on which leadership style do you lead (see figure 8)? (e.g.: "empower the follower", or based on "reward/punishment" or do you focus on employee development'')
6. Can you tell me how these leadership styles are implemented in practice?
7. What are possible bottlenecks during the implementation of the leadership style? Do you see possibilities to limit these bottlenecks and to manage the employees effectively?
   Explanation Open Innovation:
   ''Open innovation means that organizations need to use both internal and external ideas. In addition, internal and external paths must be used as organizations want to improve their technologies. External ideas come from, for example, suppliers, customers and relations. Where internal ideas come from within the organization, think of creativity and the innovative behavior of employees.''
8. How would you define open innovation in your organization? / What open innovation activities does your organization do?
9. With a view to gathering knowledge and information from external parties for the development of own products or operations, which specific aspects are used to gather external knowledge?
10. To what extent do you think it is important that collaboration and involvement of employees in open innovation should be stimulated?
11. Do you think leadership behavior can promote open innovation? How? Can you give a possible example within the organization?
12. What leadership behavior do you think can promote employee ideas from outside parties? / Do you think the specific leadership style used in the company influences open innovation behavior? Follow up - why/why not?
13. Which leadership characteristics allow for information sharing while fostering external relationships?
14. What values do these styles give to the employees who enhance innovation?
15. Which open innovation behavior would you wish from your employees regarding idea integration?

Group 2: Employees

1. Tell me something about your working experience?
2. Could you please describe your current role in the organization?
3. How would you define open innovation in your organization? / What open innovation activities does your organization do?
4. To what extent and how does your leader within the organization try to improve the open innovation behavior of you and your colleagues?
5. How does your leader react when you express an idea?
6. How does your leader support when a decision is made to integrate an idea?
7. How does your leader behave when a new idea is integrated?
8. What leadership behavior would you like to see from your leaders?
9. How often do you have feedback moments with your leader about your personal and professional development?
10. How focused is your leader on the personal development of you and your colleagues and how does s(he) do this?