

*FACTORS INFLUENCING KNOWLEDGE CONTRIBUTING AND KNOWLEDGE
SEEKING BEHAVIOUR APPLIED TO THE CASE OF LESSONS LEARNED AT
BOMBARDIER TRANSPORTATION*

UNIVERSITY OF TWENTE.



BOMBARDIER
the evolution of mobility

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Abstract

Lessons Learned (LL) are pieces of knowledge, based on experiences that can be either positive or negative, from which other people in a company can learn. The transfer of LL happens through (digital) systems. At Bombardier Transportation (BT), a global manufacturer of railway products, several of these systems exist. Among management the belief exists that these are not used to the maximum extent. The Theory of Planned Behaviour is used as a framework to analyze why employees do or do not supply or seek LL from these systems. In thirty-five semi-structured interviews with managers of departments where LL are used and LL experts, data was collected. Opinions on strengths and weaknesses of the currently used systems are gathered. Findings suggest that people can be motivated by anchoring both supplying and seeking in processes. The commitment and atmosphere among peers and management is perceived as high. Yet, LL have no high priority in projects. Several guidelines are established that enhance ease of use and perceived usefulness of LL systems. Answering to the findings, a process model for the exchange of LL is suggested and practical implications are listed. Conclusion is that the transfer of LL is best supported by a knowledge management strategy that combines codified knowledge with personalized knowledge. Literature suggests that these two strategies cannot be combined and therefore, further research focus on implications of this strategy is recommended.

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List of abbreviations

BOG	Bogies Division
BT	Bombardier Transportation
BTNA	Bombardier Transportation North America Division
IRR	Interrater Reliability
KM	Knowledge Management
KMS	Knowledge Management System
LL	Lessons Learned
LLE	Locomotives, Light Rail Vehicles & Equipment
LOC	Locomotives Division
LRV	Light Rail Vehicles Division
PI	Product Introduction
PM	Project Management
PMO	Project Management Office
PMP	Performance Management Process
PPC	Propulsion and Control Division
RAM/LCC	Reliability, Availability, Maintainability/Life Cycle Cost
RCS	Rail Control Solutions Division
REA	Rolling Stock Central & Northern Europe and Asia Division
RSAS	Rolling Stock Atlantic & Services Division
SER	Services Division
SYS	Systems Division
TPB	Theory of Planned Behaviour

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1 Introduction

The term Knowledge Management (KM) first appeared in literature in 1975 and the number of publications has been rising steadily (Gu, 2004). KM is a process of identifying, capturing and leveraging the collective knowledge in an organization to help the organization compete (Alavi & Leidner, 2001). A particular type of KM is the transfer of Lessons Learned (LL). Whilst LL were originally conceived of as guidelines or checklists of what went right or wrong in a particular event (Stewart, 1997; Weber 2000), to date LL have many definitions. All of them agree that LL concern pieces of knowledge, based on experience, either positive or negative, that are used to let other people in the organization learn from (Secchi, Ciaschi & Spence, 1999; DOE, 1999; Weber, Aha & Becerra-Fernandez, 2001; United States Combined Arms Centre, 2012).

Many organizations have technological systems in place to convey LL. Kankanhalli (2003) defines knowledge management systems (KMS) as “the class of technologies intended to support the management of knowledge resources” (p. 6). She states that KMS include a variety of filtering, indexing, classifying, storage, retrieval, communication and collaboration technologies, to enable the sharing of organizational knowledge across time and space.

These KMS can support organizational LL processes, which use a KM approach to collect, store, disseminate, and reuse experiential working knowledge that, when applied, have been shown to significantly improve targeted organizational processes (Davenport & Prusak, 2000; Weber *et al.*, 2001).

At Bombardier Transportation (BT), a worldwide manufacturer of trains and railway equipment, different facilities for the supplying and seeking of LL are in place. However, three key issues are identified. First, it is perceived that these facilities are not used to the maximum extent. The perception is that knowledge resides in the heads of people and only a fraction of this knowledge is shared in knowledge sharing systems (internal source). Second, the application of the knowledge stored in these systems is complex. This is demonstrated by the current belief among managers within several divisions that the usage and application of LL is underutilized. Third, and as a result of this, managers currently criticise that the organization can work more efficiently if people would make better use of the systems for LL.

The present thesis focuses on this underutilization by researching the underlying reasons why people do, or do not use the systems. Furthermore, reasons why people do like to use particular systems are investigated. The study suggests managerial implications that should facilitate the supply and seeking of LL, within BT and on a general level.

1.1 Research objective

This thesis investigates the motivation of people to supply or seek knowledge, in particular LL, applied to the case of LL in a multinational, project based organization. Underlying reasons for contribution and seeking behaviour are searched for. This gives an insight into how LL processes are currently organized and how they should be organized. The research goal is threefold:

First, empirical evidence is sought within the organization about factors that influence contributing and seeking LL. The Theory of Planned Behaviour is used as a framework to identify reasons why people contribute or seek LL. Interviews reveal on which parts of this theory the organization scores well and which factors lack support. Hence, the first research goal is:

Gather empirical evidence on the drivers and barriers on the motivation for knowledge contribution and knowledge seeking behaviour in BT

Second, underlying reasons why people perform this behaviour are looked into. The theory is illustrated with examples and anecdotes from practice. In situations where the supply and seeking of LL is not

successful, the underlying reasons are investigated. Based on interviews not only the underlying structures in the transfer of LL at BT are concluded but also guidelines and procedures constituting these barriers or motivations. This leads to recommendations about underlying structures and motives. The second research goal is therefore:

Identify underlying reasons for these drivers and barriers. Establish guidelines and procedures for effectively organizing the supply and seeking of LL.

Since these guidelines are based on analysis on a high level and may not be easy to implement in the organization, as a third research objective, managerial implications are established. The managerial implications contain tangible and measurable guidelines that managers can implement in order to enhance the transfer of LL. The third research goal is:

Establish managerial implications that can enhance the supply and seeking of LL.

The theoretical framework of the present work (which will be established), has three areas of focus: The attitude towards behaviour, the norms concerning behaviour and the control over certain behaviour. All these focus areas are investigated and the best solutions regarding these are proposed. Therefore, the overarching research question for this thesis is:

What are the best ways to make people use (supply and seek) Lessons Learned systems with regards to attitude, norms and control regarding this behaviour?

1.2 Research context and relevance

KM has become a popular object of research in project based organizations (e.g. Kasvi, Vartiainen & Hailikari, 2003; Ajmal, Helo & Kekäle, 2010). Kasvi *et al.* conclude that it is crucial that knowledge is systematically managed. In projects, people often do not find the time or the urge to capture and share their knowledge because they do not see the added value. Especially towards the end of the project, when time is running out, people often do not find the time to participate. The authors also conclude that there is not one solution that works for every company, but that KM differs slightly from company to company.

In this thesis, a project based organization is investigated. The research is executed at Bombardier Transportation, a worldwide manufacturer of railway products. The company is divided into six divisions, each having a different product- and geographical scope. The six divisions are supported by a Group function. Among the divisions, the current belief is that processes are so similar that LL should be shared throughout the organization.

Within the divisions, different functional departments are present. As a consequence, the divisions are divided in, for example, engineering, marketing, product introduction and planning. Each of these functional departments works on a project basis. These projects can either be trains to be developed, or new products or procedures, not directly applied (nor directly attributable) to a train. Different projects show similarities to the extent that they concern technically similar products (trains). In addition, the project process is standardized within BT. Because of these similarities, the belief in the company exists that projects can learn a lot from one another.

The research is relevant in a number of ways. First, on the company level, internal sources believe that much can be gained from the correct application of LL. As mentioned before, the different projects show great similarities and staff at all levels assumes that a considerable share of project-related knowledge is not made available when projects are finished. Second, at different places in the company, systems for LL are in place. However, the perception in the company is that these are not used effectively. At BT, management is interested in the reasons why these systems are not used to the full extent

at the moment. Third, and on a more general level, this study research adds to current literature by identifying how different factors impact supply and seeking of LL. Many researchers who have dealt with this topic before have found out which factors impact this behaviour. The present research gives practical examples of how these factors impact knowledge supplying and seeking behaviour.

2 Terminology

The following section introduces the key terminology underlying this thesis by deriving working definitions. Before analysing the dynamics of LL, it is important to establish a working definition of them. Definitions of knowledge will be reviewed in a first step, with a view to establish how these definitions are reflected by current definitions of LL. Subsequently, the terms “knowledge sharing”, “knowledge contribution”, “knowledge seeking” and the term “knowledge management system” will be discussed and defined.

2.1 Knowledge

In research, knowledge is frequently defined in relation to data and information. While the definitions differ, Wijnhoven (2008) states that “there is no unanimity on either of them but the distinction between data, information and knowledge seems to be a very popular way of thinking about what it is what we want to identify and acquire in Knowledge Integration contexts” (p. 31). Nonaka (1994), for example distinguishes between knowledge and information. Knowledge is in his view a “Justified true belief”, whereas information is a flow of messages. Knowledge is created and organized by the very flow of information. Maglitta (1995) takes another view and states that data are raw numbers and facts, information is processed data and knowledge is “information made actionable”. Wang and Noe (2010) consider “knowledge as information processed by individuals including ideas, facts, expertise, and judgments relevant for individual, team, and organizational performance”. As will be seen on the chapter defining LL, LL are according to most definitions categorized as “knowledge”. Therefore, it is more interesting to look at characteristics of knowledge, rather than the distinction between knowledge, information and data.

Alavi and Leidner (2001) distinguish in their paper fourteen types of knowledge. The discussion of definitions of knowledge shows that many different definitions exist. Wijnhoven (2008) also comes to this conclusion and states that an interesting way to look at this matter is the “a distinction among the semiotic dimension” between tacit and explicit knowledge (p. 33).

This distinction between explicit and tacit knowledge has been well described by Polanyi (1966) and Nonaka (1994). Nonaka (1994) explains that explicit knowledge refers to knowledge that is transmittable in formal, systematic language whereas tacit knowledge “has a personal quality, which makes it hard to formalize and communicate” (p. 16). Liyanage, Elhag, Ballal and Li (2009) describe that tacit knowledge resides in the human brain and is not easily captured or codified. It is knowledge that is valuable to the organization, yet, it is difficult to capture and to diffuse. Explicit knowledge is knowledge that can be stored in formal language and easily transmitted. The distinction between these two types of knowledge impacts the way knowledge is managed.

2.1.1 Knowledge Management

The term Knowledge Management (KM) first appeared in literature in 1975 and the number of publications has been rising steadily (Gu, 2004). KM is a process of identifying, capturing and leveraging the collective knowledge in an organization to help the organization compete (Alavi & Leidner, 2001). Wijnhoven (2008) identifies three levels of knowledge management: strategic, tactical and operational. The strategic level consists of the definition of the organization’s knowledge architecture. Knowledge architecture is about the information need in the longer term and how this is acquired, handled and used. The tactical level is concerned with the acquisition of resources, determination of plant locations, new product initiation, establishing and monitoring of budgets. This thesis focuses on KM on the operational level, which deals with concrete ways of developing, storing, disseminating, using and adjusting of knowledge.

Two different strategies for the management of knowledge can be identified: codification and personalization strategies (Hansen, Nohria & Tierney, 1999). Hansen *et al.* (1999) give the following definition for codification: “Knowledge is carefully codified and stored in databases, where it can be accessed easily by anyone in the company” (p. 107). The use of an electronic knowledge repository exemplifies the codification approach (Sharma & Bock, 2005). Personalization is defined by Hansen *et al.* (1999) as follows: “... knowledge is closely tied to the person who developed it and is shared mainly through direct person to person contacts. The chief purpose of computers at such companies is to help people communicate knowledge, not to store it” (p. 106).

The choice for an appropriate strategy is dictated by the type of knowledge that is exchanged. This type of knowledge is, in turn, influenced by the type of strategy of the company. The question whether standardized or customized products are offered, whether the organization is making innovative or mature products and whether people rely on explicit or tacit knowledge to solve their problems will dictate what type of strategy is used. This has an impact on the way the company serves its clients, the economics of the business and the people it hires.

2.2 Lessons learned

In this thesis, the focus is on the transfer of Lessons Learned. A definition of LL is established in this chapter, with the definitions of different types of knowledge as discussed before in mind. Literature offers several definitions of LL. They are not so much based in scientific literature but rather in practice.

The USA Department of Energy’s Society for Effective LL Sharing (SELLS) organization, originally defined a LL as a “*good work practice or innovative approach that is captured and shared to promote repeat application. A LL may also be an adverse work practice or experience that is captured and shared to avoid recurrence*” (DOE, 1999, p. 12).

The United States Air Force promotes the following definition (as cited by Weber *et al.*, 2001, p. 3):

“A lesson learned is a recorded experience of value; a conclusion drawn from analysis of feedback information on past and/or current programs, policies, systems and processes. Lessons may show successes or innovative techniques, or they may show deficiencies or problems to be avoided. A lesson may be:

- *An informal policy or procedure;*
- *Something you want to repeat;*
- *A solution to a problem, or a corrective action;*
- *How to avoid repeating an error;*
- *Something you never want to do (again)”*

The United States Combined Arms Centre (2012), part of the US Army, defines LL in their Handbook as:

“validated knowledge and experience derived from observations and the historical study of military training, exercises, and combat operations that lead to a change in behaviour at either the tactical (standing operating procedures [SOP]), TTP, etc.), operational, or strategic level or in one or more of the Army’s DOTMLPF (doctrine, organization, training, materiel, leadership and education, personnel, and facilities) domains.”

Another definition for LL is the one currently used by the American, European, and Japanese Space Agencies (Secchi *et al.*, 1999, as cited by Weber *et al.*, 2001, p. 3):

“A lesson learned is a knowledge or understanding gained by experience. The experience may be positive, as in a successful test or mission, or negative, as in a mishap or failure. Successes are also considered sources of lessons learned. A lesson must be significant in that it has a real or assumed impact on operations; valid in that is factually and technically correct; and applicable in that it identifies a specific design, process, or decision that reduces or eliminates the potential for failures and mishaps, or reinforces a positive result.”

When considering and comparing these definitions it becomes clear that they are all slightly different regarding scope and field of application. Yet, they show big similarities as well. First, all LL definitions are based on previous experiences and can be either positive or negative. Furthermore, in most definitions is defined that it can be applicable to different types of actions, such as strategic actions and operational actions (US Army) but also to policies or processes (US Air Force). Also, they need to be validated and correct (Space Agencies, USA Army).

The definition of LL as used by BT is:

A Lesson Learned is an event that can be used as an example which should be avoided, because it has a negative effect (Negative Lesson Learned), or repeated (Positive Lessons Learned) because it has a positive effect.

When this definition is mirrored with the definitions of knowledge as given in the previous chapter, we can draw the following conclusions. First, LL are based on experience. Therefore, they can exist of both explicit knowledge as well as tacit knowledge (Nonaka, 1994). They should be stored easily in order to transfer them, which is difficult for tacit knowledge (Liyanage *et al.* 2009). In the classification of “data”, “information” and “knowledge” (Maglitta, 1995), LL are in the category of “knowledge”. LL are there for the organization to optimize processes. They can be transferred either to individuals of groups of individuals. In the next section, terminology is introduced related to the transfer process and the difference between sharing, supplying and seeking knowledge is pointed out.

2.3 Definitions of knowledge sharing, supply and seeking

2.3.1 Knowledge sharing

Sharratt and Osuro (2003) give an extensive description of knowledge sharing. Key elements are that knowledge sharing involves a process in which knowledge is transferred from one person to another. Also Bartol and Srivastava (2002) state that knowledge sharing involves both the transmitter and receiver of the knowledge. This can either happen person-to-person or be via a knowledge repository. Kankanhalli, Tan and Wei (2005) state that successful knowledge sharing through an electronic knowledge repository depends on both knowledge contributors populating the repository with content and knowledge seekers retrieving content from the repository for reuse.

In this thesis, the term ‘sharing’ refers to the complete process of conveying knowledge from one person to the next. The working definition used for the purpose of this thesis is closely related to that of Sharratt and Osuro (2003): *Knowledge sharing is a process, characterized by supplying as well as receiving knowledge, which can happen either through personal interaction (following the personalization strategy) or via a digital repository (following the codification strategy).*

When the knowledge sharing happens via a digital repository, the activities of supply and seeking of knowledge are separated. Therefore these activities are elaborated in the next chapters.

2.3.2 Knowledge supply

Purpose of this chapter is to establish a working definition for the current thesis for the term ‘knowledge supply’. The term ‘contribute’ is used in literature in conjunction with electronic knowledge repositories. McLure Wasko and Faraj (2005) and Ye, Chen and Jin (2006) take the contribution to electronic networks as object of their research.

Bartol and Srivastava (2002) distinguish four ways for what he refers to as ‘knowledge sharing’. These are both ways concerned with the contribution to knowledge repositories as well as people-to-people sharing. He defines four ways to contribute knowledge:

“first, contribution of knowledge to organizational databases; second, sharing knowledge in formal interactions within or across teams or work units; third, sharing knowledge in informal interactions among individuals; and fourth, sharing knowledge within communities of practice, which are voluntary forums of employees around a topic of interest” (p.65)

These formal interactions could, for example, be formal meetings where input of employees is gathered. The first mode of supplying overlaps with what McLure Wasko and Faraj (2005) and Ye *et al.* (2006) define as contributing. About the second mode of knowledge supply, Bartol writes as an example that teams and departments may hold periodic meetings in which the leader seeks for input of employees.

In order to make a clear distinction with ‘sharing’ of knowledge as described before, ‘supply’ concerns the supply of LL to a database, and the supply of LL during formal interaction, such as team meetings of workshops. The other two means as defined by Bartol and Srivastava involve discussion with a receiving party and are therefore considered ‘sharing’. Working definition in this thesis is therefore: *Knowledge supply refers to the contribution of knowledge directly to a database and to the contribution of knowledge (indirectly to a database) in formal interaction such as workshops. Personal interaction to transfer knowledge is excluded from this working definition.*

2.3.3 Knowledge seeking

Sharma and Bock (2005) define knowledge seeking behaviour in the context of electronic knowledge repositories as the degree to which one actually uses the repository to seek knowledge. The ‘using’ is not further elaborated in their paper. Other papers by Desouza, Awazu and Wan (2006) and He and Wei (2009) do not establish a clear definition of knowledge seeking at all.

Kankanhalli, Lee and Kim (2011) research the topic ‘reuse’ of knowledge. They define ‘reuse’ as the last step of the KM process, after creation, capture and distribution. The reuse of knowledge involves users evaluating search results or updates sent to them, if they meet their needs, as well as applying the knowledge. Examples involve the transfer of best practices and the reuse of employee knowledge captured prior to their departure of the firm. The aforementioned papers deal with the consumption of explicit knowledge from digital knowledge repositories.

In the current research, ‘knowledge seeking’ refers to an adapted version of the definition of Kankanhalli *et al.* (2011) for reuse. *Knowledge seeking in this thesis refers to: both the evaluation (if they meet the needs) of usable knowledge, as well as the application of explicit knowledge.*

2.4 Knowledge sharing system

Knowledge sharing systems are tools that are used to supply knowledge to, and seek knowledge from. Alavi and Leidner (2001) define these tools as:

"A class of information systems applied to managing organizational knowledge. That is, they are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application" (p. 114).

Examples of these technologies include intranets and extranets, search and retrieval tools, content management and collaboration tools, data warehousing and mining tools, and groupware and artificial intelligence tools like expert systems and knowledge based systems. Internal talks revealed that systems as such are widespread within the researched organization. Therefore, the definition of Alavi and Leidner (2001) is used as a working definition in the current research.

Alavi and Leidner (2001) define three functions of knowledge management systems. First, they can serve as a tool for internal benchmarking with the aim of mapping best practices. Second they can be used for the creation of corporate directories. This is also known as the mapping of internal expertise. The third function a knowledge management system can serve is the creation of a knowledge network.

There are two different types of Knowledge management systems (Kankanhalli, 2003): The repository model and the network model. The repository model aims on storing and codifying knowledge in knowledge bases. Purpose of this approach is to make codified knowledge available and accessible. The network model focuses on linking people in order to transfer knowledge. This is not necessarily codified knowledge.

As for dimensions that constitute a knowledge management system, particularly for LL, Weber, Aha and Becerra-Fernandez (2000) state a number of dimensions. First, they state that the content of a LL system can either be pure or hybrid. In pure systems, only LL are stored and in hybrid systems also other knowledge artefacts, intended for reuse are stored. The role of a LL system also differs per organization. This role can either be supportive or a planning role. Furthermore, different choices can be made regarding the duration (permanent or temporarily), organization type (rigid or quickly adaptable), architecture (stand alone or embedded in processes), attributes and format (textual or non-textual or a combination) and confidentiality.

The next chapter lays out a framework that is used to assess why people use these systems.

3 Theory: The Theory of Planned Behaviour

To research what influences the knowledge contribution behaviour and knowledge seeking behaviour of people, the Theory of Planned Behaviour (TPB) is used. The TPB was first described by Ajzen (1985). The theory is designed to predict and explain human behaviour in a specific context (Ajzen, 1991). TPB has the variable ‘Behaviour’ as the dependent variable, which is predicted by intention. Intention depends on attitudes, subjective norms and perceived behavioural control. These, in turn are predicted by sets of beliefs. This is graphically displayed in Figure 1 and explained in the text below.

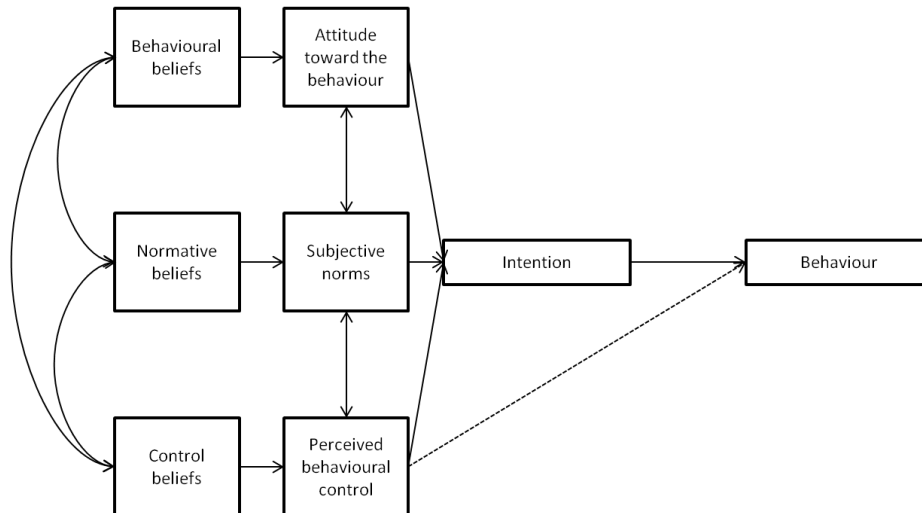


Figure 1: Theory of planned behaviour (adapted from Ajzen, 1995)

Central in TPB is the Intention to perform certain behaviour. The theory assumes that intention influences the performance of behaviour. Intention is an indication of how hard people are willing to try, or how much effort they are willing to make to exert certain behaviour. According to this theory, the stronger the intention is, the more likely it is that individuals exert the behaviour¹.

Besides intention, a second factor directly influencing the expression of behaviour is “Perceived Behavioural Control”. The performance of behaviour depends, to a certain extent, on the availability of time, money, skills and the cooperation of others. This is referred to as control. For the explanation of behaviour, however, the perception of control is more interesting (Ajzen, 1991). This deals with people’s perception of how difficult it is to exert certain behaviour. Perceived Behavioural Control, can, together with Intention be used directly to predict Behaviour.

As displayed in Figure 1, Intention to exert behaviour is explained by three determinants. The first one is ‘Perceived behavioural control’ as discussed above. The other two are ‘Attitude toward the behaviour’ and ‘Subjective norm’. Attitude toward the behaviour refers to “the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question” (Ajzen, 1991, p. 188). Subjective norm refers to “the perceived social pressure to perform or not to perform the behaviour” (Ajzen, 1991, p. 188).

These three determinants are used to predict the intention to exert behaviour. The goal of this research, however, is to explain (rather than predict) human behaviour. In order to explain how these determinants

¹ This relationship is shown for knowledge supply by Bock and Kim (2002) and Stewart and Osei-Bryson (2012), for knowledge seeking by He and Wei (2009) and Sharma and Bock (2005)

are formed, Ajzen introduces beliefs that precede these: behavioural beliefs, normative beliefs and control beliefs. These beliefs are antecedents for the three determinants attitude, subjective norms and perceived behavioural control respectively.

At the most basic level, the TPB postulates that these beliefs influence the determinants Attitude, Subjective Norm and Perceived Behavioural control. Interestingly, Ajzen (1991) states that not all three determinants are equally important in different situations. This provides additional support to this research.

The TPB has been used in previous research (e.g. Kankanhalli *et al.*, 2005; Kankanhalli, Tan & Wei, 2005a) to explain seeking and supply of knowledge. The framework created by Stewart and Osei-Bryson (2012) is used as a basis to investigate how the TPB applies on knowledge sharing. This framework is recent and includes most relevant papers regarding this theory. Below, the Behavioural, Normative and Control beliefs that are most commonly researched in relation to supply and seeking knowledge, are discussed.

3.1 Behavioural beliefs

Ajzen (1991) defines attitude as “the degree to which a person has a favorable or unfavourable evaluation or appraisal of the behaviour in question” (p. 196). The attitude towards behaviour is associated with attributes such as costs and benefits related to it. The behavioural beliefs Extrinsic Motivation, Intrinsic motivation and Organizational Commitment are researched.

3.1.1 Extrinsic motivation

Extrinsic motivation has different forms. Bartol and Srivastava (2002) state that extrinsic can exist of monetary incentives such as bonuses to non-monetary awards such as dinner gift certificates to awards such as praise and public recognition. Kankanhalli *et al.* (2005) add economic incentives that may exist of increased salary, larger bonuses, greater job security, and career advancement prospects to this definition. In the next paragraph the effect of extrinsic motivation on supply and seeking of knowledge is discussed.

3.1.1.1 Extrinsic motivation and knowledge supply

The effects of extrinsic motivation on knowledge supply are ambiguous. Bartol and Srivastava (2002) state that incentives can contribute to more input, under the right contingencies. Lee, Kim and Kim (2006) confirm Bartol and Srivastava’s statement and find out that rewards have a positive effect on the learning orientation as well as the commitment of employees. Bock and Kim (2002), however, find in an empirical study that expected rewards are negatively correlated to knowledge supplying behaviour. Reasons they suggest are that people see this payment as a reimbursement for something that they would otherwise not do, and therefore hampers their intrinsic motivation. Also, not receiving a payment may be seen as a punishment. Another form of extrinsic motivation is creating an enhanced reputation. The basic idea of a reputation system is to have a mechanism to rate the behaviour of a user and collect ratings from the behaviour of other users. This can have two goals; to incentivize good behaviour and restrain bad behaviour (Zhang, Duan & Liu, 2008). McLure Wasko and Faraj (2005) find that enhanced reputation contributes significantly to the quality and quantity of contributed knowledge.

Gagné (2009), on the other hand, takes the point of view of Human Resource practices to motivate people. Her paper is based on two fundamental theories in motivation theory: TPB and Self determining theory and suggests that five HRM practices: staffing, job design, performance appraisal and compensation systems, managerial styles and training will influence attitudes, need satisfaction and norms towards sharing. Performance appraisal in this perspective can be interpreted as a means of reimbursement for contributing ideas and therefore opposes the idea of Bock and Kim. Job design (Gagné, 2009)

is also an extrinsic motivator that is looked into in this research. Where job descriptions include the contribution of LL, the effectiveness of this is assessed.

In this research, motives to apply extrinsic motivators for knowledge supplying are examined and their effectiveness is studied.

3.1.1.2 Extrinsic motivation and knowledge seeking

Taylor and Todd (1995) find that the use of technology is positively influenced by the availability of incentives. Therefore, the use of knowledge repositories may be positively influenced by the availability of incentives. Kankanhalli *et al.* (2005) find a positive relationship between retrieving knowledge from electronic knowledge repositories and the availability of incentives, particularly under conditions of high task interdependence. This means that it works better to employ incentives in environments where the tasks depend very much on each other, so that a critical mass of people searching for knowledge builds up fast.

Desouza *et al.* (2006) take another look at the role of incentives. They state that the risk of using knowledge from others needs compensation. The perceived risk of using someone else's knowledge consists of the dimensions performance, financial, time, psychological, social, and privacy. Desouza *et al.* call for the introduction of incentives in knowledge sharing systems in order to make it more attractive to take these risks.

Kankanhalli *et al.* (2011) find that extrinsic rewards for reuse of knowledge work better if the perceived quality of the knowledge stored in the repository is high. This implies that merely providing extrinsic motivation may not be enough for an effective system of knowledge sharing; if the quality of the knowledge shared is not sufficient, the extrinsic motivation has less effect.

In the current research, there is researched which means are used to motivate people extrinsically to seek for LL. Monetary incentives and their effectiveness are searched for. Also, the existence and opinions on non-monetary incentives are researched. In line with the definition that Kankanhalli *et al.* (2005) use, also elements of job security and career advancement prospects are researched. When seeking LL is part of objectives, either on a personal or team level, this is also considered extrinsic motivation. This type of motivation does not come intrinsically, and will contribute to greater job security and career advancement prospects.

3.1.2 Intrinsic motivation

Intrinsic motivation is the doing of an activity for its inherent satisfaction. No separable consequence is connected. Fun or challenge might be grounds for people to move, rather than external pressures or rewards (Ryan & Deci, 2000). Below, different types of intrinsic motivation and their effect on knowledge supply and seeking are discussed.

3.1.2.1 Intrinsic motivation and knowledge supply

Supply of knowledge is intrinsically motivated by various reasons. McLure Wasko and Faraj (2000) find that community interest, generalized reciprocity and pro-social behaviour can motivate people to share their knowledge. Because people think contributing to the community is challenging, helps them to refine thinking and develops new insights, they contribute. Also, people find it fun, and they enjoy sharing their knowledge with others. They conclude that people who contribute to knowledge sharing, feel a moral obligation and that "it is the right thing to do". In line with this finding, Kankanhalli *et al.* (2005a) find that enjoyment in helping others is positively correlated with knowledge sharing. They find that altruism, which occurs when people take pleasure of helping others without anything in return, contributes to contributing knowledge to electronic repositories. Ye *et al.* (2006) draw a similar conclusion by stating that altruism contributes significantly to the supply of knowledge in virtual communities.

Bock and Kim (2002) find less altruistic motives that motivate people to supply their knowledge. Their research concludes that people are driven by the expectation of more relationships with others. Another finding they do is that people are driven to supply their knowledge through the intention to make an impact on the results of the company. Bock and Kim additionally state that the impact of intrinsic motivators is much stronger and lasts longer than extrinsic motivators.

In the current research, there is investigated which intrinsic motivators for knowledge supply exist and what induces this motivation.

3.1.2.2 Intrinsic motivation and knowledge seeking

The role of intrinsic motivation in knowledge seeking is researched by He and Wei (2009), who identify “User satisfaction” as a significant positive contributing factor on seeking beliefs. They do not elaborate on what the elements are where this user satisfaction comes from, besides stating that when people are satisfied with the contents of the knowledge, this is a positive influence. Also, they find that when the expectations of a certain system are satisfied, this influences their beliefs positively.

Kankanhalli *et al.* (2005) find that the perceived output quality contributes positively to knowledge seeking. They define dimensions of output quality as the relevance, reliability, and timeliness of knowledge embedded in the output. So they state that, when the perceived quality of the retrieved knowledge is high, this will be a motivation to use it. In line with this argument is the finding that Kankanhalli *et al.* (2011) do. In their research, they confirm their hypothesis that performance benefits are an argument to reuse knowledge from others. They find that the reuse of knowledge contributes positively to employee performance. In turn, this performance can also be used as a motivation for people to reuse knowledge.

In the current research, the intrinsic motivation of people is assessed. There is looked into factors that drive people to seek for knowledge and how they impact the seeking for LL.

3.1.3 Organizational commitment

Commitment to the organization refers to the duty or obligation that employees have towards the organization (McLure Wasko & Faraj, 2005). Also, commitment represents a strong belief from the employees in the goals of the organization (Ye *et al.*, 2006). In the next section, the effects of organizational commitment on supply and seeking of knowledge are discussed.

3.1.3.1 Organizational commitment and knowledge supply

Between the level of commitment from employees to the organization and the level of knowledge supply, researchers have found relationships. Stewart and Osei-Bryson (2012), find a positive direct relationship between intention to contribute and organizational commitment. Ye *et al.* (2006) draw a similar conclusion by finding a positive relationship between organizational commitment and knowledge sharing intention. According to research by Lee *et al.* (2006), not only the quantity of knowledge sharing increases with employees’ commitment, but also the knowledge quality increases. McLure Wasko and Faraj (2005) find a negative relationship between the helpfulness of a contribution and the level of organizational commitment. They state that “one potential explanation for this might be that after taking reputation and centrality into account, it is the individuals that are receiving knowledge, rather than contributing, is more committed to the network” (p. 52). Chow and Chan (2008) find that shared goals have a positive effect on both the attitude towards knowledge sharing, as well as the subjective norm regarding knowledge sharing.

In the present research, the commitment to the organization as well as the commitment to supplying knowledge is subject of research. There is investigated what drives this commitment and how this commitment is expressed.

3.1.3.2 Organizational commitment and knowledge seeking

Literature on the relation between organizational commitment and knowledge seeking was not found. A related construct, compatibility, is defined by Taylor and Todd (1995) as a factor contributing to Attitude. Compatibility is defined as “the degree to which the innovation fits with the potential adopter’s existing values, previous experiences and current needs” (p. 152). In literature concerning knowledge seeking, the topic of compatibility is seldom tested. The only paper found is by Sharma and Bock (2005). They define Compatibility as “the degree to which seeking knowledge from an EKR is perceived as being consistent with existing values, needs and past experiences” (p. 8). They find no support for their hypothesis that compatibility contributes to the sharing of knowledge. To maintain symmetry in the researched factors, in the present research the relation between commitment and knowledge seeking is also be discussed.

3.2 Normative beliefs

Ajzen (1991) defines subjective norm as “the perceived social pressure to perform or not to perform the behaviour” (p. 188). This social pressure is formed by normative beliefs, mainly consisting of pressure from an individual’s immediate manager, top management, and work colleagues. To cover all these areas, the beliefs Superior Influence, Peer influence and Organizational Climate are analyzed (Stewart & Osei-Bryson, 2012).

3.2.1 Superior influence

The influence of superiors consists of ways how superiors promote or discourage behaviour by their own behaviour. This is determined by what they say and the way they behave. The influence of superiors on supply and seeking of knowledge is discussed below.

3.2.1.1 Superior influence and knowledge supply

Lee *et al.* (2006) discuss in their paper the role of top management support in knowledge supply. It can exist of what managers say and how they behave. This, in turn influences attitudes about risk taking and how much freedom management allows. This will lead to pay raises, promotions, and other rewards. In their experiment, they find support for the relationship between the level of top management and the commitment of employees.

Bock, Kankanhalli and Sharma (2006) also stress the importance of encouragement of management to engage in knowledge supply. They state that besides support by management, also support by peers or direct supervisors is important. Appropriate feedback will have a positive effect on knowledge supply.

Many researchers have found that dimensions of the climate in the company impact the degree of knowledge supply. For example, the degree of centralization and formalization is negatively related to social interaction (Chen & Huang, 2007). Also, under conditions of top management support, the effects of organizational climate and extrinsic motivation on the intention to contribute knowledge increases (Stewart & Osei-Bryson, 2012). The effect of management on the atmosphere and regarding the contribution LL is examined in this research.

3.2.1.2 Superior influence and knowledge seeking

Taylor and Todd (1995) find support for the influence of superiors to have influence of knowledge seeking behaviour. Kankanhalli *et al.* (2005) find that subjective norms, consisting of both the influence of peers and the influence of management impact the tendency to seek knowledge positively. In this paper, however, there is not distinguished between the impact of peers and the impact of superior on the subjective norms. In the current research this division is be made. Kankanhalli *et al.* (2005) define norms as the degree of consensus in a social system. This paper does not find support for the hypothesis that norms have an impact on knowledge seeking behaviour. It might be, they suggest, that as users get acquainted with new technology the norms are overridden. Sharma and Bock (2005) emphasize the

importance of cultivating a positive culture regarding knowledge re-use. Superiors play an important role in this by encouraging and supporting their subordinates to seek for knowledge. Bock *et al.* (2006) researched norms and find that having collaborative norms impact seeking for knowledge positively.

In the present research, the influence of management on the degree of social consensus is researched. The extent and the means that management exerts in order to spread this message are considered. This can be done by several means, such as the verbal encouragement of employees or other means of informal acknowledgement of their seeking efforts.

3.2.2 Peer influence

With peer influence the effect that co-workers have on behaviour is meant. The role of social networks and ways how peers impact each other are stressed.

3.2.2.1 Peer influence and knowledge supply

McLure Wasko and Faraj (2005) argue that individuals who are central to a network tend to supply more knowledge, and the quality of their contributions is higher. This indicates that the development of a critical mass is important for sustaining a network. Theory of social capital predicts that the more direct ties, and the denser the network, will have a positive effect on collective action. Besides this social capital, Stewart and Osei-Bryson (2012) identify social inclusion as an important factor that can increase knowledge supplying behaviour. Social inclusion is the extent to which people feel socially connected to the network. Not the relationships themselves are object of interest but rather the perception of these relationships. If the social inclusion is high, Stewart and Osei-Bryson find out that people's attitudes to sharing become more positive.

Reciprocity is also a topic that is often researched. A norm of reciprocity is characterized by a sense of mutual indebtedness. When this exists, individuals want to reciprocate the benefits they have had from knowledge to the person the knowledge comes from (McLure Wasko & Faraj, 2005). McLure Wasko and Faraj (2005) find that individuals guided by a norm of reciprocity tend to contribute less to electronic networks of practice. Bock *et al.* (2006), find that the greater the anticipated reciprocal relationships are, the more favourable the attitude towards knowledge sharing is. Under conditions of weak pro-sharing norms, Kankanhalli *et al.* (2005) find out, reciprocity is positively related to the use of electronic knowledge repositories by knowledge contributors.

The current research will research the aforementioned drivers on peer influence. There is assessed how peers influence the contribution of knowledge.

3.2.2.2 Peer influence and knowledge seeking

Taylor and Todd (1995) describe that it is less likely that people use certain systems when their peers are opposed against that system. Thus, when there is agreement among peers about whether or not a system should be used, this can enhance the use of that system.

Bock *et al.* (2006) describe in their paper that collaborative norms can contribute positively to sharing knowledge. Collaborative norms are in his paper described as a degree of consensus in a social system. If these norms are relatively weak, the obligation of contributing knowledge in the future will negatively contribute to the use of knowledge, according to the paper by Bock *et al.* Sharma and Bock (2005) find out that pro-sharing norms can enhance the knowledge seeking intention. In the current research the influence of peers among each other on these norms is investigated. There is investigated if these norms exist and what the effect of these norms is. Sharma and Bock (2005) also find that trust between peers contributes positively to knowledge seeking behaviour. They define trust as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions and behaviour of another" (p.7). Sharma and Bock find that only if employees can trust on the fact that any

contribution to a repository is carefully pruned for accuracy and integrity, they will use it as a source of knowledge.

The current research elaborates on these topics, researching how norms and trust are prevalent in the departments, and how these factors impact knowledge seeking behaviour.

3.2.3 Organizational climate

With the organizational climate factors as fairness, trust and innovativeness of the organization are meant (Stewart & Osei-Bryson, 2012). The organizational climate is an outcome of the existence of these factors.

3.2.3.1 Organizational climate and knowledge supply

Several researchers find support for a positive contribution organizational climate on knowledge supplying. Stewart and Osei-Bryson (2012) mention the following concepts under Organizational climate: Fairness, Trust, Innovativeness, and a Pro-sharing norm. Kankanhall *et al.* (2005a) take similar constructs in their research and call these contextual factors: trust, norm, identification and reciprocity. They find that if there are low levels of trust, the effort one has to do is negatively related to the contribution of knowledge. Also, they find that, if pro-sharing norms are weak, reciprocity is positively related to the usage of the repository. Or, in other words, if there is little consensus on sharing behaviour, people expect something in return.

Chen and Huang (2007) show that organizational climate can promote a higher degree of knowledge sharing. Primarily, this happens through the mediating effects of social interaction. He points out that increasing trust, communication, and coordination behaviours among employees are key elements of an organizational climate that increase knowledge sharing. Chow and Chan (2008) show that social network and shared goals significantly contribute to contribute knowledge. As opposed to Kankanhalli *et al.* (2005a), Chow and Chan do not find a relationship between trust and the attitude towards supplying knowledge.

3.2.3.2 Organizational climate and knowledge seeking

There were no papers found in which the effect of organizational climate on knowledge seeking was stressed. In order to keep the symmetrical structure of factors researched in this thesis, here the effects of Fairness, Trust, Innovativeness, and a Pro-sharing norm are investigated (Kankanhalli *et al.*, 2005a).

3.3 Control beliefs

Ajzen (1991) describes “perceived behavioural control” as “perceived ease or difficulty of performing the behaviour” (p. 188) and it is assumed to reflect past experience as well as anticipated impediments and obstacles. The actual behaviour of people is strongly related with their belief in the ability to do it (Stewart & Osei-Bryson, 2012). The following beliefs, determining the perceived behavioural control, are therefore analyzed: Perceived ease of use, Perceived usefulness, Knowledge self efficacy and Resource facilitating conditions.

3.3.1 Perceived ease of use

The system in which the knowledge is shared is also often mentioned as a factor that influences how often people either contribute or seek knowledge. Davis (1989) defines perceived ease of use as: “the degree to which a person believes that using a particular system would be free of effort” (p. 985).

3.3.1.1 Perceived ease of use and knowledge supply

Stewart and Osei-Bryson (2012) find a significant positive relationship between perceived ease of use and knowledge supply intention as well as knowledge supply behaviour. Kankanhalli *et al.* (2005) do a similar finding and conclude that codification efforts are negatively correlated to the use of knowledge repositories for supplying knowledge.

In the study done by Lee *et al.* (2006), several conclusions about IT systems (which can be used to supply knowledge) are drawn. He concludes that the level of IT service quality has a positive effect on trust, employees commitment and, most important, on their learning orientation.

In the current research is assessed if ease or use is a driver or barrier for the transfer of LL. Also, drivers for the ease of use are identified.

3.3.1.2 Perceived ease of use and knowledge seeking

Desouza *et al.* (2006) find that the perceived complexity of knowledge has a negative impact on the reuse of knowledge. Desouza *et al.* describe that the more difficult to understand or use a system, the less likely people are to use it. They recommend a number of ways to increase the ease of use. The knowledge in systems should be short and concise. A standardized format to save and retrieve knowledge also contributes to a higher ease of use. The ease of use is also increased if documents start with a short statement of objective.

Sharma and Bock (2005) also find that the effort to use a system is negatively correlated with the use of a system. They use the same definition as David (1989) in their research and find that ease of use (together with perceived usefulness) is the most important factor governing knowledge seeking. Although they do not elaborate on factors influencing this ease of use, they emphasize that this is a very important factor for the use of knowledge. He and Wei (2009) find a similar relationship for knowledge management systems and state that the amount of effort that is needed to get information of a system is negatively correlated with the use of the system. He and Wei use a multifaceted construct to define effort, consisting of lack of appropriate tools, difficulty of searching and finding, insufficiency of personalization, and time and effort constraints.

In this research, the ease of use of the different LL systems will be examined. The effort it takes to seek for a LL, as well as the ease of applicability is researched.

3.3.2 Perceived usefulness

The definition used for the perceived usefulness is “the extent to which a person believes that using a particular system would enhance his or her job performance” (Davis, p. 985). In this research, the perceived usefulness of supplying and seeking LL is researched. Also, what drives this perception is researched. Below, previous research to these themes is discussed.

3.3.2.1 Perceived usefulness and knowledge supply

Sharratt and Usoro (2003) hypothesize that the perceived usefulness is positively related to knowledge supply in online communities of practice. King and Marks (2008) test this hypothesis and show that the usefulness has an impact on the frequency of supplying to a knowledge repository system. If people perceive the knowledge sharing system as useful, they are likely to contribute more frequently.

In the current research, there is investigated which systems are regarded as useful and what the factors are that impact this usefulness. Besides the two papers mentioned above, no previous research devoted to this topic is found.

3.3.2.2 Perceived usefulness and knowledge seeking

Bock *et al.* (2006) show that perceived usefulness of an electronic knowledge repository is positively related to the use, when the collaborative norms are weak. An important contribution they make is that people will not use other people’s knowledge until the usefulness reaches certain inertia. An explanation of this might be, according to Bock *et al.*, the Not Invented Here syndrome. If collaboration norms are weak, people will not like to use each other’s ideas. This Not Invented Here syndrome poses the question of whether seekers should reuse existing knowledge for organizational productivity benefits or use

their own solutions for possible credit to themselves. A higher perception of the usefulness of the ideas of other's is more important in this situation.

With regards to the perceived usefulness of knowledge (as opposed to knowledge systems), Sharma and Bock (2005) show a direct relationship between perceived usefulness and the use of knowledge. Sharma and Bock define the perceived usefulness as the most important factor (together with ease of use) governing the use of knowledge. He and Wei (2009) also find perceived usefulness to be contributing to the intention to use knowledge. Their definition of usefulness also focuses on having benefits in the job. In the current research, there is investigated if people find the use of LL useful and which factors impact this perceived usefulness.

3.3.3 Knowledge self efficacy

Self efficacy is the belief in one's capabilities to organize and execute the courses of action required to produce given goals (Bandura, 1978). Knowledge self-efficacy in the context of knowledge supply is the extent to which individuals value their own contributions to a knowledge sharing system (Stewart & Osei-Bryson, 2012; Kankanhalli *et al.*, 2005). Bock *et al.* (2006) define self efficacy in the context of knowledge seeking as the belief of an individual that he is able to search from a knowledge repository.

3.3.3.1 Self efficacy and knowledge supply

Kankanhalli *et al.* (2005) show that if people value their own contributions higher, they are more willing to contribute their knowledge to an electronic knowledge repository. Stewart and Osei-Bryson (2012), however find that knowledge self-efficacy does not contribute to the intention to contribute. They find, however, a positive relationship between the actual supplying behaviour and knowledge self-efficacy. Ye *et al.* (2006) find that knowledge self-efficacy does contribute positively to the intention to supply knowledge, which is the opposite conclusion of Stewart and Osei-Bryson.

Kankanhalli *et al.* (2005a) propose a number of ways to increase the knowledge self-efficacy. For example, if the most valuable contributors are highlighted in some way, they will feel more valued and this will increase their knowledge self-efficacy.

In the current research, there is investigated how people judge the self-efficacy of their LL and there is searched for ways to increase this self efficacy. Preliminary talks revealed that people value their contributions better when they are supported in some way to convey their knowledge. Therefore, this factor is also researched here.

3.3.3.2 Self efficacy and knowledge seeking

Bock *et al.* (2006) show a positive relationship between this self-efficacy and the use of knowledge repository systems. Thus, if people have the feeling they are capable of retrieving knowledge from a repository, they are more likely to exert this behaviour. Sharma and Bock (2005) conclude that there is an indirect relationship between knowledge seeking and self efficacy. In their paper, they find Perceived Behavioural control as a mediator.

For the sake of this research, self efficacy is defined in a slightly different way. Because the object of research is LL, there is not only chosen to assess whether or not people can find the LL, either in a digital repository or from their colleagues. Rather, since LL are intended to be applied to a future situation, there is chosen to assess whether people could find back LL, but also whether the LL were ready to apply without any help of a third party. This comes close to the construct of 'Ease of use'. The difference is here that there is investigated whether or not a third person or entity is needed in order to seek for and apply the LL. If this is the case, reasons are sought for why this third party is needed and his role is discussed.

3.3.4 Resource facilitating conditions

Taylor and Todd (1995) define in their theory two dimensions of resource facilitating conditions: time and money. The idea is that time and money are two boundary conditions that should be available in order to practice certain behaviour.

3.3.4.1 Resource facilitating conditions and knowledge supply

Several authors have contributed to literature concerning the barriers of sharing knowledge. Kankanhalli *et al.* (2005a) define two types of costs related to sharing knowledge:

- Loss of knowledge power or loss of control over unique knowledge assets.
- Codification efforts, that is, writing it up for others. Codification is costly, especially when others do not give you credit for it or when pro-sharing norms and identification with the groups and others are low.

Cabrera and Cabrera (2002) draw similar conclusions by stating that knowledge supply can contribute significantly to the performance of the company. Nonetheless, on a personal level, sharing knowledge bears significant costs. These costs can be so high, that they might even offset the benefits an individual would have from it. Wijnhoven, Schuur and Timmer (2010) take a game theoretical approach and argue that in a situation where an inventor owns knowledge, and the firm owns assets and knowledge, these two need each other in order to make the inventor's knowledge valuable. Though, when no incentives are in place, knowledge sharing will happen rather slowly, and the inventor as well as the company will not be as profitable as they could be, after an intensive bargaining process. Wijnhoven *et al.* therefore suggest that, in order to avoid greed, the company should provide incentives. Ba, Stallaert and Whinston elaborate on this topic and conclude their paper with the question which incentive system would have which effect on behaviour.

A similar way of solving this is, instead of incentivizing this behaviour, providing time and budget to share knowledge. In the current research, there is focused on the effect of budgets for LL. There is investigated if, and how budgets are made available. The effect of the availability of budgets is also investigated.

3.3.4.2 Resource facilitating conditions and knowledge seeking

Bock *et al.* (2006) finds that resource facilitating conditions indeed contribute positively to EKR usage for knowledge seeking. The conditions that he uses are resources such as training, management support, time and system availability. Sharma and Bock (2005) find a positive relationship of the availability of training, management support, slack time and low time pressure on perceived behavioural control, which in turn has a positive effect on knowledge seeking behaviour. There can be concluded that resources such as time and budget are important indeed, but the availability of training and management support can also enhance the reuse of knowledge.

In the current research, there is looked at the availability of time and budget for seeking LL. The availability itself is assessed, as well as the reasons why budget is dedicated or not.

4 Research methodology

4.1 Selection of an appropriate research method

This section elaborates how the beliefs as mentioned in the previous chapter are researched. Many researchers have taken a quantitative approach on this topic to find out which factors impact either knowledge sharing or knowledge seeking behaviour (e.g. Kankanhalli *et al.*, 2005; Kankanhalli *et al.*, 2005a; Bock *et al.*, 2006; Stewart & Osei-Bryson, 2012; Sharma & Bock, 2005). In the current thesis, however, the research question is not which factors impact this behaviour. Rather, the question ‘why’ and ‘how’ these factors impact behaviour is stressed. Yin (2009) argues that, to answer this type of questions, a case study approach is appropriate. Furthermore, Yin states that a case study approach is appropriate when examining contemporary events, but when the relevant behaviours cannot be manipulated. In this research, the phenomena knowledge supply and seeking are subject, and the research is done in a real-life context, i.e. BT. Boundaries between the phenomenon and context are not clearly evident. Rather, interactions between the organizational context and the phenomena, knowledge supplying and seeking, are the subject of research. The fact that phenomenon and context are not easily separated provides another argument to use a case study, according to Yin (2009).

Yin (2009) defines three categories of case studies: Exploratory, descriptive and explanatory. Exploratory case studies are conducted when a researcher examines a new interest or when the subject of study is relatively new. In the current case, this does not apply, because the study is based on existing theory which is known and the phenomena studied are described in previous studies. Descriptive case studies describe the phenomena studied in the case. However, these studies are seldom limited to a descriptive purpose. Implications and explanations are usually added to the description. This is what defines the third category: explanatory case studies. The observations that are done are explained and typically, factors and variables that lead to events or behaviour are explained. This research has two aims: identifying factors that influence knowledge sharing and seeking behaviour, and explain what drives these factors. Therefore, the type of case study chosen is an explanatory case study. According to Yin (2009), a case study approach can involve various types of data. In the next chapter the collection of data is discussed.

4.2 Data collection

4.2.1 Methods

According to King (2004) the goals of a qualitative research interview is to obtain the view of the interviewee and to understand how he has come to this perspective. In this research, the reasons to participate or not in the use and contribution of LL are sought. By interviewing managers and experts, their perspective on this topic is obtained. The use of qualitative interviews is here appropriate. By comparing perspectives, there will be concluded which factors play a role and how these factors play a role.

Data is collected through semi-structured interviews. Interviews are held with people from different divisions, in different functions and disciplines. This leads to a broad insight in how LL are used in different departments and how successful they are.

In the interviews, two types of questions are asked. Questions were asked regarding the existence of LL in the organization and how this is organized and how successful this is. These questions obtained insights in the perceived success of the process. The interviewee is asked to share his or her beliefs with regards to the usage of such a system and if the system is used to the optimal extent. If not, the interviewee will be asked how the discussed factor contributes to the usage or non-usage of LL. This second question, to the underlying reasons, is key in this research.

The second set of questions concerned questions regarding the different factors. Each factor and sub-factor and its impact on the success of a LL system will be discussed. There is asked how this factor is executed.

Example: for the factor external rewards on knowledge sharing – *Which external rewards are awarded for sharing a LL?*

If the answer is positive, the next question will be:

How do external rewards impact the rate of knowledge sharing? Could you illustrate that with an example?

The interviews are conducted, where possible, face to face. When this was not possible (for example when the interviewee is based at another site), interviews are held over the phone. Face-to-face interviews were the preferred option. The interviews were recorded, when allowed by the interviewee. A total of 35 interviews were conducted. Of these interviews, 2 were conducted face to face and 33 were held telephonically. In all 35 cases the interviewee gave permission to record the interviews. The interview protocol can be found in Appendix A.

Whilst triangulation of case study findings with other data is advisable (Jick, 1979), such data was not available from BT.

4.2.2 Selection of interviewees

Interviewees are employees of BT. They are either managers of departments where LL are used or experts, managing a particular LL process. They are chosen for these people for two reasons. First, these people have a good overview of the LL process itself and are able to give clear descriptions about the organization of their process. Second, they are expected to have a good idea about what motivates their subordinates when contributing or using LL. The research aims on a broad understanding of the usage of LL. Therefore, people from a wide range of disciplines are chosen. Third criterion in deciding whom to interview was the availability of people.

BT is divided in six divisions. Within these divisions, six different functions are identified. In order to get a varied view of the use of LL, a matrix is established and managers from the different functions in the different divisions were identified for interviews. People from the following Divisions are invited for interviews:

- BT North America (BTNA)
- Systems (SYS)
- Locomotives, Light Rail Vehicles & Equipment (which is divided in subdivisions):
 - o Bogies (LLE – BOG)
 - o Propulsion and control (LLE – PPC)
 - o Light Rail Vehicles (LLE – LRV)
 - o Locomotives (LLE – LOC)
- Rail Control Solutions (RCS)
- Rolling Stock Atlantic & Services (RSAS)
- Rolling Stock Central & Northern Europe and Asia (REA)

People from the divisions are employed in the following disciplines:

- Project Management (PM) / Project Management Office (PMO)
- Engineering
- Product Introduction (PI)
- Quality

- Procurement
- Reliability, Availability, Maintainability, Life Cycle Cost (RAM / LCC)
- BID

Table 1 indicates which departments were inquired. The number in the box indicates the number of interviewees from this department.

	PM / PMO	Engineering	Product Introduction	Quality	Procurement	RAM / LCC	BID
BTNA	2			1	1		
SYS	1	1		2			
LLE / BOG	1						
LLE / PPC	1	1	1	1	1	1	
LLE / LRV	5		1			1	
LLE / LOC	1			1			1
RCS		1		1			
REA	1	1		1	1	1	
RSAS	1		1		1		

Table 1: Interviewee selection

4.3 Data analysis

The obtain data are coded in order to draw conclusions. Coding is the classification or categorizing individual pieces of data, coupled with some retrieval system (Babbie, 2010). Three types of coding exist: open, axial and selective coding.

In open coding, the text will be broken down in small pieces and these pieces will get a code, identifying the *key concepts in the text*. This is a good starting point for coding. Axial coding aims to identify the core concepts of the study. The results of open coding can be used for this method. It involves regrouping of the data obtained in open coding. In selective coding, *the* central theme of the study is sought.

In this research, the data will be coded per factor from the theory. Per factor, the answers will first be coded, according to open coding. Then, axial coding will take place (Babbie, 2010). Babbie discusses two types of coding: Manifest coding and latent coding. The first refers to coding of visible, surface content. This means that words and phrases are coded and counted. The advantage of this method is that it is easy and reliable. However, a disadvantage is that the validity is not guaranteed. In different contexts, words may have a different meaning. With latent coding the underlying meaning of the text is coded. This is more suitable to capture the underlying meaning of the text, but it may be difficult to employ constant definitions throughout the research, which will hamper the reliability and specificity. Babbie suggests that the best solution is to, where possible, use both methods for data coding. Also, he states that conceptualization and operationalization of the constructs involve the interaction of theoretical concerns and empirical observations. The coding will therefore start after the first interview and the new, coded, data will be added after each new interview. If during the interviews, it turns out that certain

questions are obsolete, or lack, the interview script will be adapted. The general idea of the interviews will remain the same though.

The answers are analyzed per question. Thus, this means that for each questions, the codes are tallied. The questions are related to the beliefs in the Theory of Planned behaviour. From this tallying, insights can be gained about which beliefs are prevalent within the different organizations. These beliefs contribute to the three different constructs “Attitude”, “Subjective norm” and “Perceived behavioural control”. Where possible, generalizations will be made per construct. Because the beliefs that are tested are very different from each other, it is not likely that a word count or any other form of manifest coding is suitable for generalizations within the constructs. Therefore, latent coding will be used.

4.4 Reliability and Validity

Morse, Barret, Mayan, Olson and Spiers (2008) state that reliability and validity of data in qualitative research are a key aspect, as it otherwise loses its value. Reliability refers to the extent to which the data collection will yield consistent findings (Saunders, Lewis & Thornhill, 2006). Validity is concerned with the question if the findings are really indicating what they seem to indicate. Questions about cause and effect for example can seem to exist, whereas this is not there.

4.4.1 Interrater reliability

As the interviews were held and coded by two persons, it is important to determine to what extent these coders agree on the interpretation of the results. Several measures can be used to assess the interrater reliability (IRR) between two coders. These measures provide an upper bound of the degree of accuracy in the ratings. It is by no means a guarantee that the ratings in fact reflect the dimension they are supposed to reflect. On the other hand, if the agreement is poor, one can be sure that usefulness of the ratings is severely limited (Fleiss, Levin & Paik, 1981).

In this paper, Cohen’s Kappa (Cohen, 1960) is used to determine reliability. In order to use this statistic, the data need to satisfy the following three conditions:

- The units are independent
- The categories of the nominal scale are independent, mutually exclusive and exhaustive
- The judges operate independently

Condition one is satisfied by the fact that the interviewees are not related to each other. The second condition is satisfied by the fact that the interviewees are free to give any answer. The answers are summarized in codebook, which will be described later. This is done to create a nominal scale, in which the categories are independent, mutually exclusive (no hierarchy in the answers), and exhaustive.

Cohen’s Kappa is determined by the following procedure (based on Hrushka *et al.* 2004). First, the two codes have made a list with codes, based on a first reading of the results. These codes were summarized in the codebook.

Based on the codes in this codebook, the interviews were coded by the first coder. From the coded interviews, two questions were taken and for these two samples, Cohen’s Kappa was determined. There was chosen for a sample of the results to determine the IRR of the results for feasibility reasons. For this project, no budget was made available by the company, and since the second rater was an employee of the company, the resources were limited.

In the interviews, some interviewees gave answers on which more than one code was applicable. In these cases, more than one code was awarded. For the occasions where the coders disagreed on the number of codes, an extra code named [No entry] was added. Thus, when coder one awarded codes [A]

and [B] to and answer that the second coder only gave a code B, the entry for the IRR was [A]-[A] (agree), [B]-[No entry] (disagree).

Two questions from the interviews were coded double: the questions related to extrinsic motivation for supplying and for seeking of LL. The values for Cohen’s Kappa are shown in the Table 2:

Extrinsic motivation seeking	0.68
Extrinsic motivation supplying	0.59

Table 2: Cohen’s Kappa for two questions

According to the scale of Landis and Koch (1977) these values correspond with a moderate and substantial agreement respectively, as can be seen in Table 3. These values are considered high enough to proceed with these findings. The tables in which the two coders are compared are displayed in appendix B.

< 0	Poor agreement
0.0 – 0.2	Slight agreement
0.21 – 0.4	Fair agreement
0.41 – 0.6	Moderate agreement
0.61 – 0.8	Substantial agreement
0.81 – 1	Almost perfect agreement

Table 3: Reliability scale (Landis & Koch, 1977)

4.4.2 External validity

Saunders *et al.* (2009) define external validity as the extent to which the results of a certain research can be generalized to other situations. For example, if the findings can be applied to another research setting, such as to another organization. If the number of organizations that is focus of the research is small, it might be difficult to generalize the findings to other situations. In this research, the number of interviews held is 35. All these 35 interviews were held within the same organization. The interviews were conducted across different divisions, as well as different functions. The spread in functions and divisions should ensure that many different research settings are used. Different competencies are enquired (technical, quality, procurement etc.). Also, the interviewees were selected from management functions and had long experience in the company. Interviewees were asked for their opinion on different topics, which were often based on their experience with this topic. The variety of competencies and the long experience of the interviewees contribute to the external validity positively.

4.4.3 Four strategies to secure reliability and validity of the data

Morse *et al.* (2008) define five strategies to ensure reliability and validity. Below, four from these five strategies are discussed and applied to the current research. The fifth strategy applies to theory development studies. The current research is explanatory and does not develop a theory. The fifth strategy is therefore not applied.

1. Methodological coherence

The methodology must be appropriate to answer the research question. In this research, the question how different factors impact the supplying and seeking of LL is answered. Because the research question is rather focusing on the reasons behind certain behaviour, a explanatory case study approach is chosen. The appropriateness of this method is discussed in 4.1.

2. The sample must be appropriate

Morse *et al.* state that the research sample must satisfy certain criteria. First, the participants must have knowledge of the research topic. Second, the sample must be adequate. This is ensured by data saturation. The first criterion is satisfied by taking managers of departments where some type of LL were

used and experts of LL systems from different departments. In the interviews was checked, if the interviewee found himself knowledgeable on the topic of LL. The second criterion was not checked for. However, due to the large number of interviews, 35, there can be assumed that an adequate sample is taken. Recommended numbers of interviewees is, according to Guest, Buns and Johnson (2006), 12 or more. They state: "For most research enterprises [...] in which the aim is to understand common perceptions and experiences among a group of relatively homogeneous individuals, twelve interviews should suffice". As the group is homogeneous (the interviewees have similar professions, within the same company), 35 interviews suffice.

3. Collecting and analyzing data concurrently

By conducting the interviews and analyzing the content of these interviews as soon as possible afterwards, this criterion is satisfied. Also, to ensure correct analysis, two raters have analyzed the data, and the interrater reliability was determined (cf. 4.4.1)

4. Thinking theoretically

Morse *et al.* describe that ideas that rise from collected data must be checked when new data is collected and must be verified in old data. This strategy is capsulated in the way the interviews are done. After each interview, the recordings were typed up and summarized. The summarized interviews were then coded and these codes were compared with the previous interviews. When needed, the interview protocol was changed to include new ideas.

5 Findings

5.1 Introduction to the findings

Each chapter starts with a table summarizing the answers, given in the interviews, per belief from the theory, based on the open and axial coding. The text below the table explains the answers that are summarized in the table. The columns of the table are labelled as follows:

- **CN:** CN-is short for ‘Code Number’. This column contains a Code Number for the results with the purpose of identifying the codes and to refer back to the results in the text below. In the text below, this number is referred to as “CN”.
- **Code name:** States a short name given to the type of answer, summarizing the answers.
- **Exemplifying quote/paraphrase:** Contains an example of an answer, illustrating and clarifying the type of answers under this Code Name. This is either a direct quote or a paraphrased answer. The number in brackets (starting with “ID-“) indicates the identification-number of the interview this statement came from.
- **N:** Contains the frequency of occurrence of this type of answer in the interviews. The total number of interviews conducted is 35 and all interviewees were asked to answer all questions.

For each of the beliefs, first the results of the “supplying” of LL are discussed and then the results for “seeking”. Each chapter ends with a short conclusion, summarizing the findings regarding this belief.

5.2 Extrinsic motivation

5.2.1 Extrinsic Motivation and knowledge supply

Text removed for confidentiality.

5.2.2 Extrinsic motivation and knowledge seeking

Text removed for confidentiality.

5.2.3 Extrinsic Motivation – Conclusion

Text removed for confidentiality.

5.3 Intrinsic motivation

5.3.1 Intrinsic Motivation and knowledge supply

Text removed for confidentiality.

5.3.2 Intrinsic Motivation and knowledge seeking

Text removed for confidentiality.

5.3.3 Intrinsic Motivation – Conclusion

Text removed for confidentiality.

5.4 Organizational commitment

5.4.1 Organizational commitment and knowledge supply

Text removed for confidentiality.

5.4.2 Organizational commitment and knowledge seeking

Text removed for confidentiality.

5.4.3 Organizational commitment – Conclusion

Text removed for confidentiality.

5.5 Superior influence

5.5.1 Superior influence and knowledge supply

Text removed for confidentiality.

5.5.2 Superior influence and knowledge seeking

Text removed for confidentiality.

5.5.3 Superior influence – Conclusion

Text removed for confidentiality.

5.6 Peer influence

5.6.1 Peer influence and knowledge supply

Text removed for confidentiality.

5.6.2 Peer influence and knowledge seeking

Text removed for confidentiality.

5.6.3 Peer influence - Conclusion

Text removed for confidentiality.

Organizational climate

5.6.4 Organizational climate and knowledge supply

Text removed for confidentiality.

5.6.5 Organizational climate and knowledge seeking

Text removed for confidentiality.

5.6.6 Organizational climate – Conclusion

Text removed for confidentiality.

5.7 Perceived ease of use

5.7.1 Perceived ease of use and knowledge supply

Text removed for confidentiality.

5.7.2 Perceived ease of use and knowledge seeking

Text removed for confidentiality.

5.7.3 Perceived ease of use – Conclusion

Text removed for confidentiality.

5.8 Perceived usefulness

5.8.1 Perceived usefulness and knowledge supply

Text removed for confidentiality.

5.8.2 Perceived usefulness and knowledge seeking

Text removed for confidentiality.

5.8.3 Perceived usefulness – Conclusion

Text removed for confidentiality.

5.9 Self efficacy

5.9.1 Self efficacy and knowledge supply

Text removed for confidentiality.

5.9.2 Self efficacy and knowledge seeking

Text removed for confidentiality.

5.9.3 Self efficacy – Conclusion

Text removed for confidentiality.

5.10 Resource facilitating conditions

5.10.1 Resource facilitating conditions and knowledge supply

Text removed for confidentiality.

5.10.2 Resource facilitating conditions and knowledge seeking

Text removed for confidentiality.

5.10.3 Resource facilitating conditions – Conclusion

Text removed for confidentiality.

6 Recommendations regarding LL for BT

Text removed for confidentiality.

6.1 Recommendations for a knowledge management strategy

Text removed for confidentiality.

6.2 Recommendations for a process model

Text removed for confidentiality.

6.3 Organizational recommendations

Text removed for confidentiality.

6.4 Recommendations for IT Infrastructure

Text removed for confidentiality.

7 Conclusion and implications

This thesis started with the question what the best ways are to organize the supply and seeking of LL. The Theory of Planned Behaviour was used to decompose supplying and seeking behaviour into three determinants of behaviour which, in turn, were influenced by beliefs. In this research, beliefs were studied that impacted the determinants Attitude, Subjective norms and Perceived behavioural control of knowledge supply and knowledge seeking behaviour. Insights were gained on what impacts these determinants.

First, from the insights gained with regards to behavioural beliefs – “the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question” (Ajzen, 1991, p. 196) - this study shows that intrinsic motivation plays an important role. This research has shown that people find it satisfying to help their peers and want to make products better. The most commonly found extrinsic motivator was including the supply and seeking of LL in the team’s or personal objectives. The finding that the commitment towards the supply and seeking of LL is generally high, leads to the conclusion that the attitude of BT staff towards supply and seeking of LL is positive.

With regards to normative beliefs - “the perceived social pressure to perform or not to perform the behaviour” (Ajzen, 1991, p. 188) - this study finds that both peers and management exert such pressure. Among management, as well as peers, a positive atmosphere existed. It was found, however, that particularly the attitude of management towards this behaviour has a high value among the interviewees. Based on this finding, an important conclusion is that the support of management is key to motivating people to supply and seek LL.

Under control beliefs - “perceived ease or difficulty of performing the behaviour” (Ajzen, 1991, p. 188) – the study notes that a majority of interviewees currently find it difficult to supply and seek for LL. The most important conclusion based on this finding is that a suitable KM strategy will have to combine codification and personalization aspects. This research has shown that the transfer of this particular type of knowledge is perceived most effective and easy when a combination of these two strategies is used. Moreover, several boundary conditions for the installation of an IT system to support LL were presented.

In combination, all three findings mentioned above demonstrate that ‘support’ will always be the starting point of having effective supply and seeking of LL. Neither supply nor seeking of LL will happen automatically. Support, however, will be provided from three directions: first, in form of additional extrinsic motivation by making it part of mandatory processes; second, in form of support by management, enabling staff to supply and seek LL; and finally, in the form of a strong underlying process model.

8 Limitations

Limitations that may hamper the results or the interpretation of the results must be acknowledged. A limitation of the study is that some interviewees were biased by the fact that they want to give positive answers. Because the interviews were conducted on behalf of the Group function, interviewees might have felt the pressure of an assessment of their duties regarding LL. Even though the interviewees were provided a clear briefing that the interviews were part of a student's Master's Assignment, interviewees may have wanted to sketch a more positive image regarding LL than is actually the case. This transpires when comparing the answers for the part on commitment with answers for the part related to budgets. People mentioned a high commitment, but replied in the part covering budgets that the capturing of LL is often skipped when time is running out.

A methodological limitation is that two interviewers were used. Even though interviewers were in contact throughout the period the interviews were conducted, styles of interviewing have changed unavoidably. In order to have a consistent style of coding the results, the interrater reliability (IRR) was determined (cf 4.4.1). Assessing the IRR for the first two interview parts, the research team established favourable values for IRR (cf. Table 2). The IRR of the remaining parts of the interview was not determined, due to time constraints of the second rater. The second rater was a fulltime employee of the company (Specialist Knowledge Management) and her day-to-day work had higher priority. Therefore, the current sample was taken. The sample consisted of 2 questions from the interview. The other questions had different content. Therefore, the sample might be a good indicator for the rest of the interview but it is difficult to establish whether or not this sample is representative.

Moreover, the interviews were accompanied by three complicating factors that were not expected during the preparation of the research. First, it was for some questions difficult to separate the effects on supply and seeking of LL. Especially the interview parts regarding the influence of people (peers, superiors etc.) were often answered in such a way that it was difficult to distinguish between the two. However, often it emerged from the context that the answer applied both to supplying and seeking. In the cases where it was justified, the same answer for both seeking and supplying was used. Second, not all interviewees were able to answer all questions. This is due to the research design deliberately chose managers and LL experts as interviewees, as the belief was that they would have a good insight in the perceptions of LL in their department. However, the questions about organizational climate, commitment and peer influence turned out to be difficult to answer and therefore the input on these questions is relatively low. The third complicating factor was that some constructs were conceptually relatively close to each other. Even though they were theoretically defined, it turned out that interviewees found it difficult to make a distinction between organizational climate, commitment, peer and management influence. In order to overcome this problem the interviews were, after summarizing, reviewed and where the answers given did not match with the questions, the answers were moved before coding.

8.1 Further research

From this research six avenues for further research can be identified:

- First, the most important direction of further research is the addition of a third strategy for knowledge management, besides codification and personalization. Because codification only suffices for a limited part of the knowledge and personalization does not allow for dissemination of knowledge on a large scale, a third, new strategy should be identified. It would be of interest to further study the design and implications of such a third strategy.
- Second, and in line with the hypothesis of Gagné (2009) and the findings of this research, job design can have a big impact on the contribution and seeking of LL. The current research sug-

gests two ways of job design that improve seeking and application of LL: including LL processes in personal or team objectives, as well as making them part of an obligatory part of the job, such as a workshop. The most effective job design, as well as the exact effectiveness is something that will be promising avenues for further research.

- Third, a review of existing literature did not yield any publications on the role of organizational climate on knowledge seeking behaviour. However, in this research, Receptivity of people, Trust, and Small group size were mentioned as factors that contribute positively to knowledge seeking. It would be of interest to investigate the effect of these factors on knowledge seeking behaviour.
- Fourth, a factor mentioned to contribute to the usefulness of supplying knowledge was the similarity of projects. This factor was not found in literature. Nonetheless, the effect of the similarity of projects on knowledge supply could be an interesting topic of further research. This research could lead to insights on contingencies that lead to knowledge supplying behaviour.
- Fifth, research on the availability of resources for supply of knowledge is focused on the role of incentives. The present study shows that incentivizing the supply of LL is not a common practice. Nor was the explicit availability of budget to cover the corresponding costs found in the organization. The effect of this is not known. Further research could reveal the effect of making budget (i.e., either time or money) available for the supply of LL as an incentive.
- Sixth and last, this research has shown that “positive contribution to the company” can be a motivation to supply LL. For seeking knowledge, this hypothesis is found in previous research, but not for supply of knowledge. The exact effects may be researched by means of a quantitative study.

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Appendix A: The interview protocol

To facilitate our note-taking, we would like to audio tape our conversations today. For your information, only researchers on the project will be privy to the tapes. The following conditions apply: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm. Thank you for your agreeing to participate.

We have planned this interview to last no longer than one hour. During this time, we have several questions that we would like to cover. If time begins to run short, it may be necessary to interrupt you in order to push ahead and complete this line of questioning.

A. Interviewee Background

How long have you been ...

_____ in your present position?

_____ working for BT?

B. Backgroup LL Process

1. Could you tell us briefly how the use of LL is organized in your organization?

2. How successful are LL used in your organization, both contributing as well as application?

C. The contribution of LL

C.1. Normative beliefs

C.1.1. Extrinsic motivation

Which mechanisms for external motivation for contribution of LL exist in your organization (e.g. Monetary incentives, reputation)

If yes: Which mechanism? How do you think this influences the contribution (in terms of quantity and quality)?

If no: Why not? Do you think this would make a difference in the number/quality of contributions?

C.1.2. Intrinsic motivation

Which internal motivation for contribution of LL exist in your organization (e.g. Fun, learning effect)

How do you think this influences the contribution (in terms of quantity and quality)?

If no: Why not? Do you think this would make a difference in the number/quality of contributions?

C.1.3. Organizational commitment

How committed are you and your colleagues to submitting LL (i.e. To what extent do they agree with the importance of LL)

Do you have an example of how this is expressed?

C.2. Behavioural beliefs

How does organizational climate contribute to the use of LL? (i.e. Norms, trust)

More specific: How are people supported by their management to contribute LL?

More specific: How are people supported by their peers to contribute LL? Does social inclusion play a role in this?

C3. Control Beliefs

C.3.1. Perceived ease of use and usefulness

Do you and your colleagues find it easy to submit LL?

If no: what do they find difficult

Do you and your colleagues find it useful to submit LL?

If no: why not?

C.3.2. Knowledge self efficacy

Is the usefulness of the LL made explicit? (as in: can you see how many times a LL is (successfully used)

If no, why not?

Do you think this would contribute to the number of contributions?

C.3.3. Knowledge sharing costs

How do you and your colleagues perceive the costs of knowledge sharing?

Is the payoff of knowledge sharing sufficient? (i.e. Do you and your colleagues have more benefits than costs out of the sharing of knowledge?

If no: what is the reason for this? (e.g. sharing takes too much time, loss of knowledge/power)

D: Knowledge seeking

D.1. Attitude

D.1.1. Perceived usefulness and ease of use

Is the ease of use a barrier for you and your colleagues to use LL?

If yes: What exactly find people difficult? (e.g. Apply text to project, read different language)

Is the perceived usefulness a barrier for you and your colleagues to use LL?

If yes: which aspects do they not find useful?

How can the perceived usefulness, according to you, be improved?

D.2. Subjective norms

D.2.1. Peer influence

How would you describe the influence of peers on each other on the use of LL?

Do they influence each other positively? Do you have an example?

D.2.2. Superior influence

How do managers encourage their subordinates to use LL?

Do managers give compliments when LL are used?

Do managers give incentives when LL are used?

D3. Perceived behavioural control

D.3.1.: Knowledge self efficacy

How does self efficacy of LL (explain) play a role in the use of LL?

D.3.2. Resource facilitating conditions

How are employees facilitated in terms of time and money to use LL
Do you think this is enough? Do you think this can be improved?

Appendix B: Interrater reliability

Question C1 – Supply:

Frequencies:

		Coder 2						
		1	2	3	4	5	6	
Coder 1	1	30						
	2		14			2		
	3		1	1				
	4				2	1		
	5	1	2			7	2	
	6		1	2	1	3		
			31	18	3	3	13	2

Percentages:

		1	2	3	4	5	6	
1	0.428571	0	0	0	0	0	0	0.428571
2	0	0.2	0	0	0.028571	0	0	0.228571
3	0	0.014286	0.014286	0	0	0	0	0.028571
4	0	0	0	0.028571	0.014286	0	0	0.042857
5	0.014286	0.028571	0	0	0.1	0.028571	0	0.171429
6	0	0.014286	0.028571	0.014286	0.042857	0	0	0.1
	0.442857	0.257143	0.042857	0.042857	0.185714	0.028571	0	1

Used codes:

1. No incentive
2. Part of process (PMP, workshop)
3. Negative attitude towards ext mot
4. Positive attitude towards ext mot
5. Part of job (no process)
6. No entry

Question C1 – Seeking:

Frequencies:

		Coder 2						
		1	2	3	4	5	6	
Coder 1	1	33						
	2		18	1		1	1	
	3			1				
	4					1	2	
	5		1	1		3	4	
	6		1	3	2	5		
		33	20	6	2	10	7	78

Percentages:

		1	2	3	4	5	6	
1	0.42307 7	0	0	0	0	0	0	0.42307 7
2	0	0.23076 9	0.01282 1	0	0.01282 1	0.01282 1		0.26923 1
3	0	0	0.01282 1	0	0	0		0.01282 1
4	0	0	0	0	0.01282 1	0.02564 1		0.03846 2
5	0	0.01282 1	0.01282 1	0	0.03846 2	0.05128 2		0.11538 5
6	0	0.01282 1	0.03846 2	0.02564 1	0.06410 3	0		0.14102 6
		0.42307 7	0.25641	0.07692 3	0.02564 1	0.12820 5	0.08974 4	1

Used codes:

1. No incentive
2. Part of process (PMP, workshop)
3. Negative attitude towards ext mot
4. Positive attitude towards ext mot
5. Part of job (no process)
6. No entry