

Learning behavior, strategy and performance

A Structural Equation Modeling Study

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Abstract

The theme for this study is organisational learning and strategy, and more specifically about the relationship between learning behaviour, strategy and performance.

There were two research questions. The first is regarding the relationship between learning behaviour and performance, with the research question being:

Does increased use of learning behaviour in a business simulation have an impact on the overall performance in the business simulation?

The second research question is regarding the relationship between learning behaviour, strategy and performance, with strategy divided in two variables, quality factors and implementation factors. The research question is:

Does increased use of learning behaviour increase the use of both implementation factors and quality factors? And will an increased level of implementation factors and quality factors lead to improved performance?

Based on theory and research from among others Argyris and Schön (1996), Amy Edmondson (1999), Hanne Iversen (2006) and Henri Mintzberg (2000, 2007), two theoretical models were developed.

The models were tested empirically using Structural Equation Modelling, on a sample of mid level managers participating in a strategy simulation

After modifying the second model, the empirical findings are in accordance with the hypothesised models, and the relationship between learning behaviour and performance, as well as learning behaviour, strategy and performance is confirmed in the simulation.

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1 Introduction

The theme for this study is organisational learning and strategy. More specifically, it is about the relationship between learning behaviour, strategy and performance. The goal is to examine how organisational learning, expressed by learning behaviour, can improve the quality and implementation of the strategy, and lead to better organisational performance. It is not about describing how the strategy should look like when it is finished, but behaviours and processes that will bring the organisation towards its goals

So why focus on strategy? In 2006, McKinsey Quarterly conducted a survey on strategic planning among nearly 800 executives from around the world. In this survey, they found that many participants [in the strategic-planning process] say they are frustrated by its lack of impact on either their own actions or the strategic direction of the company. Actually, just 45 percent of the respondents said they were satisfied with the strategic-planning process. Moreover, only 23 percent indicated that the process produced major strategic decisions (Dye and Sibony 2007: 41-42).

Further more, Chris Zook and James Allens report that between 1988 and 1998, seven out of eight companies in a global sample of 1854 large corporations failed to achieve profitable growth. That is, these companies were unable to deliver 5.5% annual real growth in revenues and earnings while earning their cost of capital. Yet 90% of the companies in the study had developed detailed strategic plans with much higher targets (Kaplan and Norton 2005 : 1)

In addition, research shows that, on average, 95% of a company's employees are unaware of, or do not understand, its strategy (Kaplan and Norton 2005 : 1), and according to Walter Kiechel, only 10% of formulated strategies actually got implemented (Mintzberg, Ahlstrand, Lampel 1998: 177), a number that was called "wildly inflated" by the renowned business writer Tom Peters (Mintzberg 2000: 25).

To summarise, managers are dissatisfied with the strategic planning process and the impact it has, employees are unaware of and do not understand the strategy, and companies does not

implement their strategy and deliver what they say they will deliver. So clearly there is room for improvements.

So what can organisational learning do for strategy? According to Argyris and Schön, there is a growing agreement that the development of strategy requires organisational learning (Argyris and Schön 1996: xviii). And seeing strategy from a different viewpoint can be beneficial, and can be understood by what is called theory charged observation. For Norwood Hanson, all observations are fundamentally shaped by our prior knowledge, and are therefore an epistemic achievement (Kvernbekk 2002: 42-43). So a MBA graduate from a business school observing a group formulating strategy would have a different perspective than someone with process knowledge, i.e. pedagogy or psychology. Where the MBA graduate would see faults in the way they use models, the process “expert” would perhaps see faults in the way they interact. Seeing that the business world has quite many more MBAs than pedagogues involved in the strategy process, this influence the way strategies are made.

What makes people change their models and theories? According to Ronald Griere, some people are simply unfamiliar with the models. They are not part of their cognitive repertoire (so if MBAs have not learned any models or theories for strategy process, it will be hard for them to adapt to the strategy process model) (Kvernbekk 2002 : 77).

So hopefully, this study can shed some light on the process side of strategy in a way that also MBAs and others can accept, and show how organisational learning is can be positively related to performance.

1.1 Research questions

The purpose of this study is to investigate the influence on performance from certain factors, labelled as learning behaviour, implementation factors and quality factors. I have developed two research questions:

- 1 Does increased use of learning behaviour in a business simulation have an impact on the overall performance in the business simulation?

The research question is shown in the model below.



Figure 1: Research question 1: Does increased use of learning behaviour in a business simulation have an impact on the overall performance in the business simulation?

Learning behaviour is represented by questions like to which degree they have good conversation, express the reasoning behind their viewpoints and ask for the reasoning behind others team members' viewpoints. These behaviours are assumed to increase the possibility of learning, and allow the team to adapt and improve.

- 2 What is the relationship between learning behaviour, implementation of strategy, quality of strategy and performance? Does increased use of learning behaviour increase the use of both implementation factors and quality factors? And will an increased level of implementation factors and quality factors lead to improved performance?

The theoretical model would look like this:

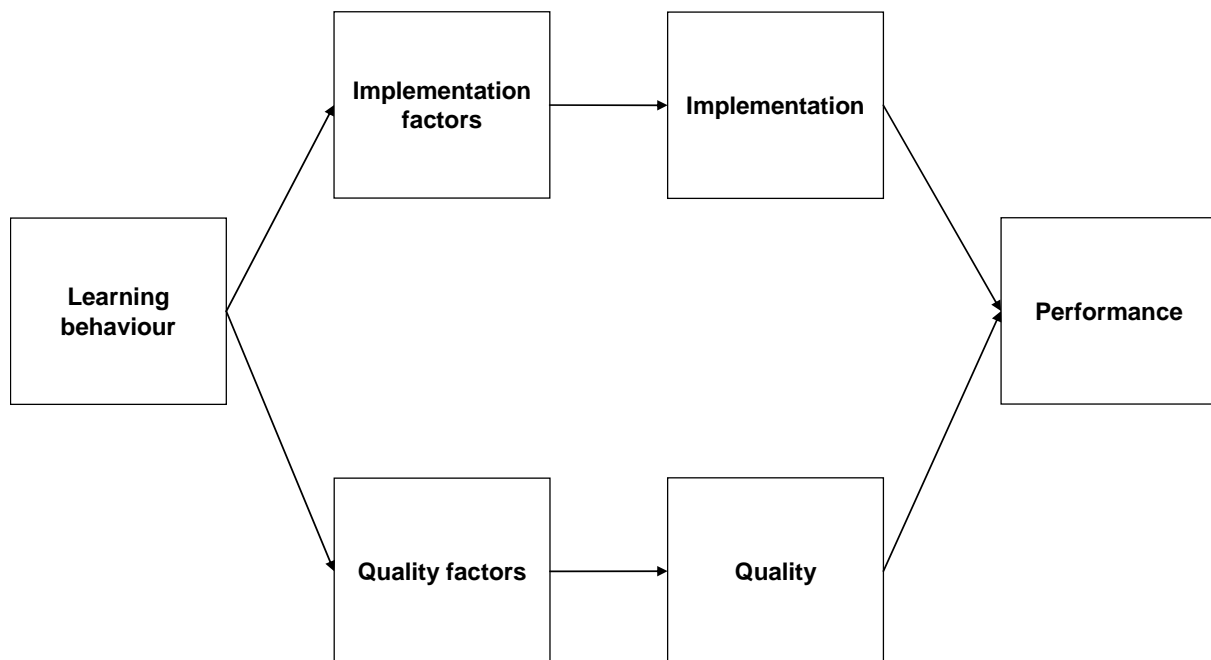


Figure 2: Theoretical model for research question 2: What is the relationship between learning behaviour, implementation of strategy, quality of strategy and performance?

Quality factors are represented by question about experimentation, ability to utilise ideas and ability to learn from mistakes and successes, and are assumed to improve the quality for the strategy.

The box “Quality” in the above figure is the actual quality of the strategy.

Implementation factors are represented by questions about understanding of the strategy, commitment and implementation, and are assumed to improve the implementation of the strategy.

The box “Implementation” is the actual implementation of the strategy.

I am going to assume that better quality and better implementation of the strategy will lead to improved performance, and that both the quality and implementation of the strategy is best indicated by the performance of the company. It is important to keep in mind that formulating

and implementing strategy is the explicit task of the participants in the simulation. This means that the use of learning behaviour as well as the implementation factors and quality factors should impact this, and that it is the quality and implementation of strategy that determines performance. This also suggests that performance is the best indicator of the quality and implementation of strategy. Following this, the model can be simplified:

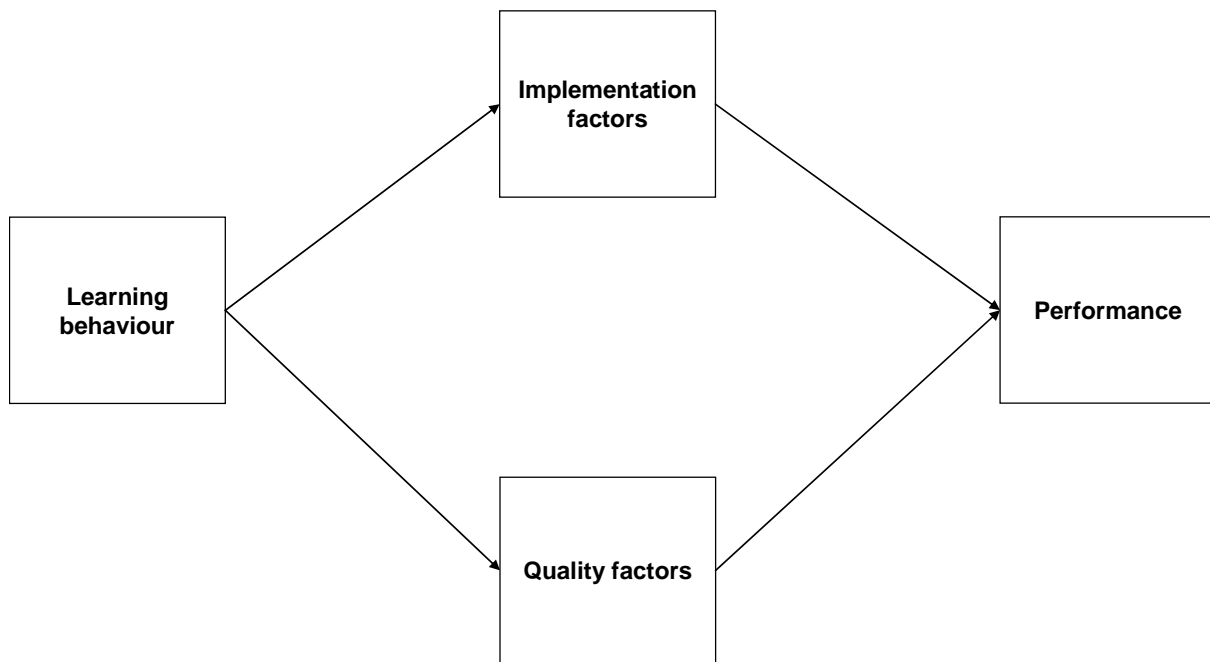


Figure 3: Research question 2: Does increased use of learning behaviour increase the use of both implementation factors and quality factors? And will an increased level of implementation factors and quality factors lead to improved performance?

1.1 About the simulation

The business simulation is a simulated business environment, where teams of experienced managers compete in a business situation similar to that they normally work in. The business simulation is used as part of training programmes within the organisation. The teams compete against each other, and the main challenge is to formulate and implement a strategy better and faster than the competition. All teams start from an identical starting point, and the simulation provides a controlled and risk free environment, where the performance of the different teams is only impacted by the decisions taken by the competing teams. Structural features expected to influence team effectiveness, such as the design of team task, availability of information and resources, physical environment (Edmondson 1999: 1) are the same for all teams.

The purpose of the Business Simulation module is:

- To strengthen the participants' ability to formulate a consistent strategy and understand the consequences of executing the strategy

The simulation is developed by a European company specialised in developing and running simulations, and was based on a number of interviews with managers and executives in the modelled organisation, extensive gathering of quantitative data from within the organisation and from other parts of the industry, and several rounds of testing in order to make the simulation as realistic as possible.

The fact that they are explicitly asked to formulate a formal, intended strategy is important, in that this formulation is a major part of their task, which again therefore can be influenced by learning behaviour. The decisions they had to make comprise of for example which customer segments to target, which products to offer as well as pricing and risk strategies.

Throughout the simulation they go through several decision periods, where they formulate and implement strategy, and through this can learn about the business and the business environment. In addition, they receive input on strategy theory between the decision periods.

The Business Simulation provides a business environment, in which learning will take place experientially. Through trial and error the participants seek to lead the simulated corporation in a rapidly changing business environment. This experience attempts to illustrate important elements of the organisation's realities and goals, but is not designed to reflect them completely.

In this learning environment, several years of business activity is compressed into a finite number of decision periods, making it possible to see both short term and long term consequences of the decisions. . Compared to making decisions in a real business situation, the simulation's learning environment adequately reproduces its main aspects, whilst providing fast feedback. Each of the competing teams will have to devise a corporate strategy and to experiment in a simulated environment with various decision-making processes aimed at implementing the chosen strategy.

The Business Simulation focuses on the effective implementation of strategy, and success is measured along four key performance indicators (KPIs):

- Growth of income
- Operational excellence and strict costs management
- Capital Efficiency and Credit Portfolio Quality
- Development of the human resources in the company

Several corporations are competing against each other in four different and separate customer segments while offering four types of products and services. Each corporation is led by an executive team entitled to take a series of corporate decisions. These decisions will focus on allocating funds and resources effectively within the corporation in terms of channel strategy, human resources capabilities, cost controls and process improvements.

These decisions will be taken against the background of a changing economic climate, represented by the relevant indices. The evolution of the markets is also impacted by the actions taken by the competing corporations.

The team mission is to implement the best possible strategy. The teams will take multiple decisions to allocate effectively the resources available. The winner in the marketplace will be the team who has delivered a better performance on as many dimensions as possible.

1.2 Composition

After the introduction, where the research questions will be presented, I will go through relevant theory on organisational learning, learning behaviour and strategy in chapter 2. Then I will present methodological considerations in chapter 3, before presenting the findings from the structural equation modelling. In chapter 5 the findings will be discussed, and in chapter 6 I will conclude on the study.

2 Theoretical foundation and relevant research

In the following, I will try to ground the model in theory. I will start by describing organisational learning and learning behaviour, before I will look into the concept of strategy.

2.1 Organisational learning

The last few decades, organisational learning has appeared as a central part of organisational success. The need to adapt to changing environments, and to create new knowledge to be able to realize images of a new future, has made organisational learning into a common term of growing interest. Several authors argue organisational learning as a process which has the potential to transform organisational life, and as central for organisations to be able to change and innovate (Argyris and Schön 1996: xvii, Friedman, Lipshitz and Overmeer 2003: 757).

As Peter Senge states:

Over the long run superior performance depends on superior learning (Senge 2004: 506).

In this paper, I focus on organisational learning in the tradition of openness and inquiry.

Friedman et al. defines organisational learning as:

A process of inquiry through which members of an organisation develop shared values and knowledge based on past experience of themselves and others (Friedman, Lipshitz and Overmeer 2003: 757).

According to Friedman et al., it is widely claimed that effective organisational learning requires a climate of inquiry, openness and trust (Friedman et al 2003: 760).

This process is an inherently experimental, creative process because it pushes organisational members to the edge of their current state of knowledge (ibid: 771-772). According to Hakkarainen, Palonen, Paavola and Lehtinen (2004), learning can be seen as a process of innovative inquiry, in which the goal is to progressively expand one's knowledge and skills by relying on previous experiences and knowledge (Hakkarainen et al.: 109).

This notion of inquiry is important to Argyris and Schön, and their view of inquiry is based on the work of John Dewey. In Deweyan inquiry, action and thought are interwoven on the way from doubt to the resolution of doubt. (John Dewey 1938, in (Argyris and Schön 1996: 11). Doubt comes from the mismatch between the expected and the actual result of an action. This doubt is then resolved by thought and further action, until the result of the action becomes what is expected (Argyris and Schön 1996: 11). One question to consider is how learning goes from being individual to organisational. This happens when individuals within an organisation experience a problematic situation and inquire into it on the organisation's behalf, and the resulting learning is reflected in the images of the organisation held in its members' minds, or in the organisation's artefacts (Argyris and Schön 1996: 16). In Deweyan inquiry, the inquirer is an actor within a situation, actively trying to understand and change it (Argyris and Schön 1996: 31).

It's the idea that inquiry will surface knowledge, ideas and assumptions that will benefit both the learning process and product. By process I mean how we learn, and by product I mean what we learn (Argyris and Schön 1996: 3). In this paper, the learning product will be the actual strategy, and the learning process is the strategy process, that is, the process producing the strategy.

Double-loop learning

Argyris and Schön describe the way organisations deal with problematic situations through the processes of single-loop or double-loop learning.

Upon meeting a problematic situation, single-loop learning would mean adjusting procedures and actions without changing the underlying assumptions guiding these actions and procedures, and would be occupied with how to achieve existing goals and keeping

organisational performance within the boundaries of existing norms and values (Argyris and Schön 1996: 20-22).

Double-loop learning, on the other hand, occurs when inquiry into the organisations goals and its boundaries of existing norms and values leads to these goals and boundaries being changed (Argyris and Schön 1996: 22). For organisational inquiry to be described as double-loop learning, it needs not only inquire into the objective fact, but also the underlying motives and reasoning behind a suggestion or a viewpoint (Argyris and Schön 1996: 27). Double-loop learning surfaces the assumptions and norms of the organisation, and enables the testing and restructuring of these (Friedman, Lipshitz and Overmeer 2003: 758).

This view is supported by Nonaka and Takeuchi (1995). According to them, there is general agreement on that learning consists of two kinds of activity. The first one is learning know-how in order to be able to solve specific problems based on existing premises, and the second is establishing new premises with new beliefs and mental models to replace the old ones. These two forms of learning correspond to Argyris and Schön's notion of "single-loop learning" and "double-loop learning". Knowledge creation involves an interaction between these two forms of learning (Nonaka and Takeuchi 1995: 44).

As can be seen in the figure below, single-loop learning points to the feedback loop from consequences to actions. This means that if there is a mismatch between the expected consequence of an action and the actual consequence, one would try to correct the action.

Double-loop learning points to the feedback loop from consequences to governing variables. This means that if there is a mismatch between the expected consequence of an action and the actual consequence of an action, one would question the underlying assumptions and ideas behind carrying out the action.

Below you can see a figure illustrating double-loop learning.

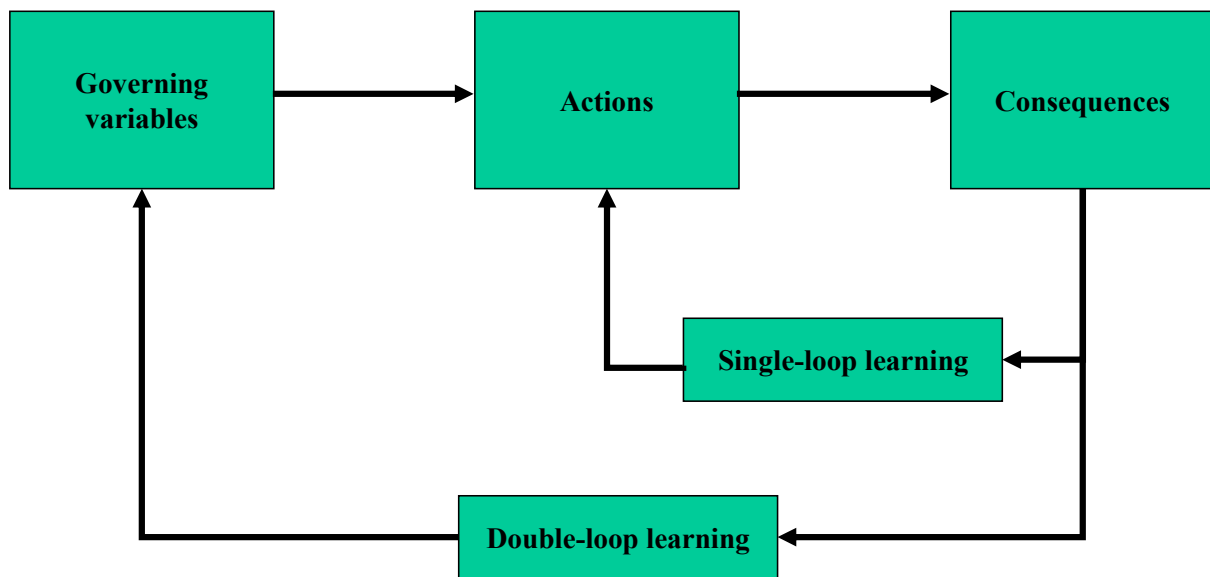


Figure 4: Double loop learning. Based on Argyris (1999: 68)

One type of problematic situation that could appear for an organisation, is a mismatch between the expected consequences the strategy and the actual consequences of the strategy. One example of such a mismatch could be if the organisation is unable to implement its strategy (Argyris 1999: 165).

If we put this into a strategy situation, as the figure below, shows single-loop learning could mean trying to correct the implementation plan, while double-loop learning could mean questioning the underlying strategy.

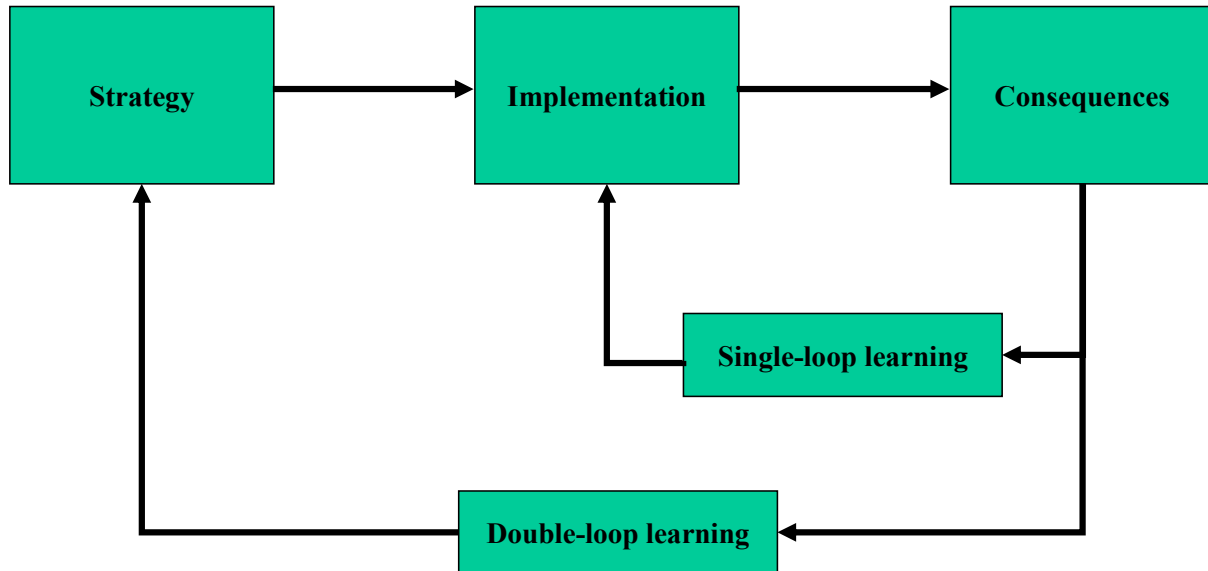


Figure 5: Double loop strategizing. Adapted from Argyris (1999: 68)

As Mintzberg et al. writes, it could be claimed that failure in implementation is also a failure in formulation (Mintzberg, Ahlstrand and Lampel 1998 : 177). Still, most commonly, a failure in implementation leads to attempts to improve implementation, by which is normally meant things like tighter management or better control systems (Mintzberg 2000: 284).

Pfeffer and Sutton, on the other hand, have a different view. They claim that they often see strategy rejected that is not working because it is poorly implemented, not because it is the wrong strategy (Pfeffer and Sutton 2006: 152).

My assumption is that this is something that has to be considered from instance to instance, but in an organisation capable of double-loop learning, it is at least possible to question the strategy if implementation fails. Hopefully, openness and inquiry as I have described it would also improve the possibilities of making the right decision on whether to improve implementation or change the strategy.

Model II theory-in-use

To increase the likelihood of double-loop learning to occur, Argyris and Schön prescribe “Model II theory-in-use (Friedman, Lipshitz and Overmeer 2003: 757).

Model II conditions seek to maximise the contribution of each member in the group, so that the decision process includes an examination of the widest possible range of relevant views, and concepts created under Model II conditions will have been subject to scrutiny by those who are expected to use them (Argyris and Schön 1996: 119).

If Model II behaviour is used, the degree of defensiveness will tend to decrease, and double-loop learning increase (Argyris and Schön 1996: 119). Model II theory-in-use results in higher internal commitment (Argyris and Schön 1996: 118).

These behaviours enhance the conditions for double-loop learning, and thereby the surfacing of assumptions and norms central to the organisations theory-in-use, which then again can be openly tested and restructured (Friedman, Lipshitz and Overmeer 2003: 758).

The most important parts of Model II are valid information, free and informed choice and internal commitment. Model II combines advocacy with inquiry, so that one can advocate one’s own view and at the same time invite others to confront this view and give their own opinion. Model II sets out to surface different views and emotions in order to get the most complete and valid information possible and to construct positions to which people can get internally committed. A Model II actor is skilled in inviting double-loop learning from other individuals. This involves sharing power with anyone who has the competence and is relevant to involve in a decision (Argyris and Schön 1996: 117).

2.1.1 Tacit knowledge

Another perspective on learning comes from Nonaka and Takeuchi (1995) and their notion of tacit knowledge. Tacit knowledge is knowledge that is not easily visible or expressible, and both knowledge and assumptions can be tacitly held, meaning something that is not easily visible or expressible. This makes this kind of knowledge hard to communicate and share with others (Nonaka and Takeuchi 1995: 8). Tacit knowledge has two dimensions, which is the technical dimension which is skill and “know-how”, and the cognitive dimension which consists of mental models, beliefs and perceptions so deep-seated that they are taken for granted. Within this dimension lies our image of reality (what is) and our vision for the future (what ought to be). These deep-seated mental models shape the way we perceive the world around us (Nonaka and Takeuchi 1995: 8).

Peter Senge has a similar view, and claims that we carry with us assumptions in the form of mental pictures, and that these mental pictures are so deeply deep-rooted that they are mainly tacit. These mental pictures influence how we perceive problems and opportunities, identify courses of action and make choices (Senge 2004: 508-509).

This way of seeing knowledge is different from the way of seeing knowledge as explicit, formal and systemic (Nonaka and Takeuchi 1995: 8). Explicit knowledge can be gathered, compiled and shared, while the subjective nature of tacit knowledge makes it difficult to access and share with others (ibid).

If you as an example imagine being able to perform some kind of activity, but not being able to explicitly communicate how you do it to the extent that someone else can copy it, the dimension you are not able to communicate is tacit knowledge. This would be what Polanyi (1966) express when he states: “We know more than we can tell” (Nonaka and Takeuchi 1995: 60).

According to Nonaka and Takeuchi, “the key to knowledge creation lies in the mobilisation and conversion of tacit knowledge” (Nonaka and Takeuchi 1995: 56), and Senge states that if mental pictures remains unexpressed, there is little possibility of challenging them or form

more correct assumptions (Senge 2004: 509). So the tacitly held knowledge and assumptions are important input in the strategy process, but if tacit knowledge does not become explicit, it cannot easily be utilised by the organisation as a whole (Nonaka and Takeuchi 1995: 70). When Mintzberg claims that much of the knowledge managers have seems to be tacit (Mintzberg 2000: 268), and Pfeffer and Sutton claims that one of the reasons for knowledge not turning into action is the lack of attention to tacit knowledge (Pfeffer and Sutton 2004: 517), the question that arises is: How can tacit knowledge be made external so that it can be fully utilised by the organisation?

To try to answer this, we turn again to Nonaka and Takeuchi, who puts suggests four modes of knowledge conversion. The four modes are:

Socialisation: From tacit to tacit

Socialisation happens through sharing experiences and thereby creating tacit knowledge such as shared mental models, and makes it possible to put oneself into another person's individual thinking, and (Nonaka and Takeuchi 1995: 62-63). In the simulation, through the sharing of the experience of formulating and implementing strategy, they come to share mental models of and understand each other and better.

Externalisation: From Tacit to explicit

Externalisation happens when tacit knowledge is articulated into explicit concepts and models. Externalisation is typically seen as triggered by dialogue or collective reflection. Among the four modes of knowledge conversion, externalisation is the key to knowledge creation, because it creates new, explicit concepts from tacit knowledge (Nonaka and Takeuchi 1995: 64-66). In the simulation, they externalise their tacit knowledge through discussing and openly reflecting on the strategy it self, and the experiences they have with implementing it, and then articulate it into explicit concepts which can be ideas for a new or revised strategy.

Combination: From explicit to explicit

Combination happens through systemising concepts into a knowledge system, where different concepts are combined and integrated into a higher-level concept (Nonaka and Takeuchi 1995: 67-68). In the simulation, this means that they combine different strategic ideas coming out of the externalisation mode into one strategy.

Internalisation: From explicit to tacit

Internalisation happens when explicit knowledge is internalised into the individuals' tacit knowledge base (Nonaka and Takeuchi 1995: 69). In the simulation, this means that the strategy they have decided upon becomes part of each participant's tacit knowledge.

So an answer to the question of how utilise tacit knowledge that is of special interest for this study, it is that it happens through inquiry and discussion. Nonaka and Takeuchi writes that knowledge is created in the interaction between individuals, and that knowledge can be improved on the group level through dialogue and discussion. This dialogue can involve conflict and disagreement, but it is this kind of conflict that pushes employees to question existing assumptions (Nonaka and Takeuchi 1995: 13-14). A parallel view can be found with Overmeer that writes that "in response to the helpful inquiry of others, managers may learn to articulate their ideas more fully", frame them as hypothesis and test them publicly. This helps make tacit knowledge explicit (Overmeer 1996: 256)

2.2 Learning behaviour

To take this thinking further, I will look into what kind of behaviours that could increase the chance of organisational learning to occur. According to Argyris and Schön, an organisation's learning system has two parts; organisational structures and the behavioural world of the organisation. It is this learning system that creates the conditions for organisational inquiry, hindering or improving the likelihood that important issues will be addressed and that assumptions will be openly discussed and tested (Argyris and Schön 1996: 28).

This behavioural world of the organisation consists of the underlying qualities, meanings and feelings that form the interactions among the members of the organisation in such a way that it promotes or hinders organisational inquiry. These interactions can be friendly or hostile, open or closed, flexible or rigid, competitive or cooperative, error-embracing or error-avoiding, productive or defensive (Argyris and Schön 1996: 29).

Friedman et al. divides this behavioural world into three parts; contextual, psychological and behavioural factors. The behavioural factors points to the kind of observable actions that are likely to encourage organisational learning (Friedman, Lipshitz and Overmeer 2003: 760).

The four behavioural factors are transparency, inquiry, disconfirmation and accountability (Friedman, Lipshitz and Overmeer 2003: 762).

- Transparency points to the extent to which actions, thoughts and intentions, as well as the reasoning behind their opinions and actions is disclosed as clear and honest as possible. Transparency increases the possibility of getting valid information.
- Inquiry means questioning and probing into the situation to get as much data as possible so that one can construct an image of the situation which is as close as possible to reality.
- Disconfirmation means that one openly admits to errors and changes ones mind if other perceptions or interpretations have been show to make more sense.
- Accountability means taking responsibility and holding oneself accountable for actions and their consequences, as well as learning from mistakes and taking corrective measures for lessons learned, and experiment with new behaviours in order to stimulate learning (Friedman, Lipshitz and Overmeer 2003: 762).

In this thesis, I will focus on the behavioural part of the learning system, and specify this behavioural world by the concept of learning bahviour.

Learning behaviour consists of activities carried out by team members through which a team gains and processes data that allow it to adapt and improve. Seeking feedback, sharing information, talking about errors and experimenting are examples of learning behaviour.

Through behaviour like this, teams can become aware of changes in the environment, improve the members' collective understanding and detect unexpected consequences of their previous actions (Edmondson 1999: 1-2).

In many cases, members of groups tend to not share unique information that they hold, so that the group discussion becomes limited to jointly held information (Stasser and Titus: 1987, in Edmondson 1999: 2). A central problem is that people find initiating learning behaviour a risk, for example by appearing incompetent by admitting an error or asking for help. Asking

for help, admitting errors and seeking feedback are examples of behaviours that people avoid in order to save face, even when doing so would provide benefits for the team or the organisation (Edmondson 1999: 2).

Edmondson conceptualizes learning at the group level of analysis as “an ongoing process of reflection and action, characterized by asking questions, seeking feedback, experimenting, reflecting on results and discussing errors or unexpected outcomes of actions”. If a team is to discover that their strategy doesn’t work and make changes accordingly, the team must be ready to test their assumptions and discuss different viewpoints openly rather than privately or outside the group. Edmondson refers to this set of activities as learning behaviour (Edmondson 1999: 3).

According to Gibson and Vermeulen, it is experimentation, reflective communication and knowledge codification that constitute learning behaviour (Gibson and Vermeulen 2003: 20). They write that the process of learning is made up of several interdependent actions, since solutions have to be searched for, chosen and implemented, and that several authors have described it as a cycle of activities which teams engages in to be able to adapt and improve. First, a team has to generate ideas on improvements through exploration or experimentation. Then a team have to arrive at a common understanding through reflective communication, in which the team members transfer and combine insights which enables them to arrive at potential solutions. Finally, the knowledge has to be converted into concrete concepts, decisions or actions through a process of codification, where tacit knowledge becomes explicit. Codification means recording what has been discussed (e.g. putting it on paper). The codification process enables the team to put knowledge and ideas into practice and to reflect and build on what has been learned (Gibson and Vermeulen 2003: 205).

Model of learning behaviour

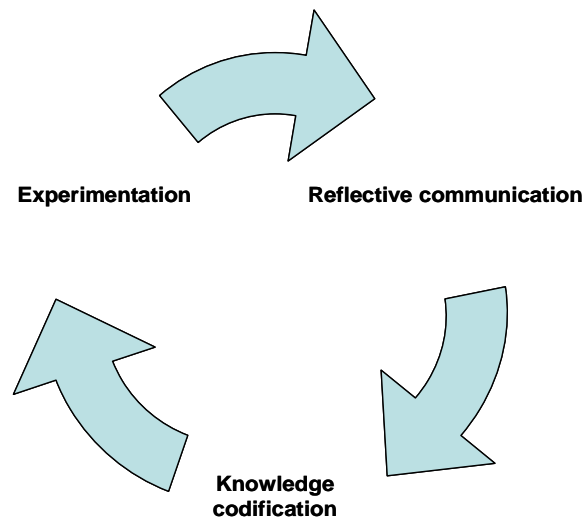


Figure 6: A model of learning behaviour. Based on Gibson and Vermeulen (2003)

Research suggests that teams frequently think they have agreed on a shared understanding, but that this agreement fails when they start making it explicit (Mohrman, Cohen and Mohrman 1995, in Gibson and Vermeulen 2003: 206). Because of this, teams may fail to learn and improve even if they engage in experimentation and reflective communication, if they don't converge on an explicit, implementable solution through the process of codification (Edmondson 2002, in Gibson and Vermeulen 2003: 206).

Previous research by Edmondson (1999: 9) and McArthur (McArthur 1994, in Iversen 2006: 30), and Iversen (2006: 38) show a positive relationship between learning behaviour and performance.

This is supported by Hjertø, who states that research has found that communication and feedback skills, which corresponds partly to learning behaviour, have a positive relationship to team effectiveness (Hjertø 2008: 114-115).

Even if the terms used to describe the actual behaviours are different to some extent, they refer to corresponding activities, and are in line with what we have seen when it comes to inquiry.

2.2.1 Learning behaviour and performance

I have previously argued that there is a positive relationship between learning behaviour and performance. This is previously established through research by Edmundson (1999) and McArthur (McArthur, in Iversen 2006, and Iversen (2006). This is also part of what I set out to do in this study.

However convenient their findings are, the question of what predicts what might not be that simple. While finding that learning behaviour is positively related to performance, Iversen actually found that it is performance that predicts learning behaviour, meaning that performance at one point in time predicts learning behaviour at a later point in time. She suggests a model based on this. The model below shows how learning behaviour at time T1 (LB T1) influences performance at the same time (P T1), which then influences learning behaviour at a later time (LB T2) (Iversen 2006: 31).

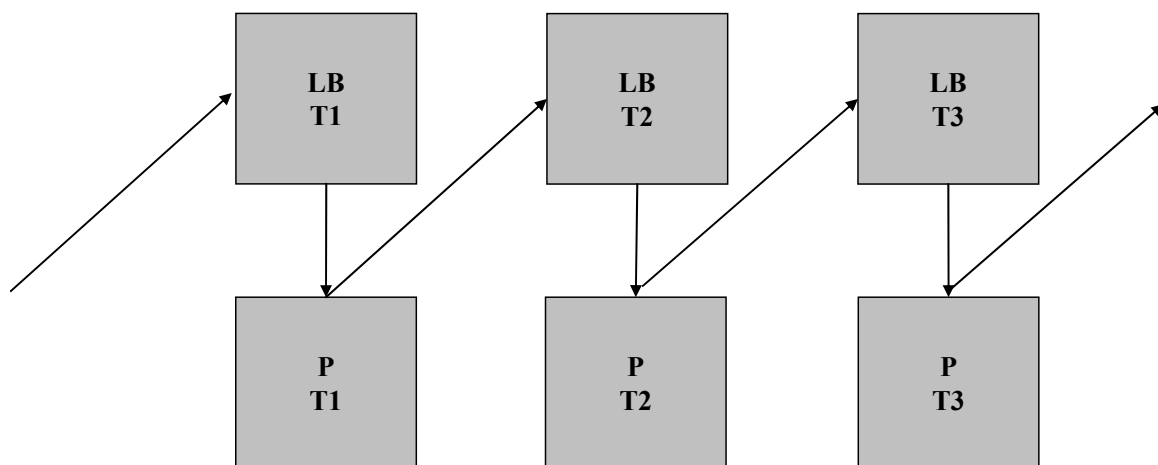


Figure 7: Learning behaviour – performance model. From Iversen (2006: 31)

She can not verify this model empirically, but theoretically she grounds it in what she sees as the function of learning behaviour, which is to avoid unfavourable conclusions through surfacing own and others thinking and assumptions and seeking the reasoning of others. This can contribute to increasing the information available for the decision, in a way that increases the quality of the decision. This way, learning behaviour is assumed to influence performance at the same point of time. This would imply that learning behaviour at T1 influences

performance at T1 (Iversen 2006: 31-32). This is in line with MacCallum and Austin, who argue that it is not unusual that the time lag in which the causal effect operates is effectively instantaneous, thereby justifying the interpretation of a causal effect (MacCallum and Austin 2000: 214).

In the context of this study, and the business simulation, this model begs a question. In the business simulation, the participants meet for the first time. When they sit down to make their first decision, they have no prior experience of working together. One could say that this is point zero, time T0. A model showing this is displayed below.

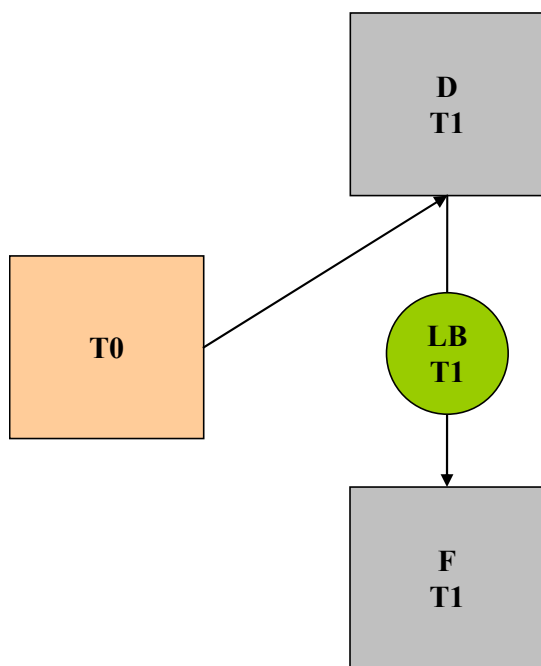


Figure 8: Performance can not influence learning behaviour at T1

In the model, “D” represents decision, “LB” represents the measuring of learning behaviour and “F” represents feedback on performance, which is when they is informed of how they did in the decision. It is assumed that the decision made at T1 influences the performance at T1, and that they don’t get the results from the decision until after learning behaviour has been measured. In the simulation, the respondents have no contact with the other teams during the decision, so they have no information about how they may have performed at LB T1.

From the model, we see that “F” at T1 can not influence “LB” at T1, since the temporal order is LB T1 before P T1. Since Iversen’s model is depicted as a perpetual sequence of performance and learning behaviour influencing each other (ibid), my question is: What starts the process?

In the business simulation used in this study, it is highly unlikely that they have a good picture of their own performance, before they have got feedback on their first decision. For me, this means that within the simulation, the starting point for the learning behaviour–performance cycle is learning behaviour. If learning behaviour influences performance, then the learning behaviour exhibited at T1 will influence performance at T1, hence learning behaviour starts the process. This is supported by findings by J. Richard Hackman, who found that what happens the first time a group meets has a strong effect on how the group operates the rest of its life (Hackman 2009: 102). Later in the simulation, it could be that performance predicts learning behaviour, but the trigger appears to be learning behaviour. In this study, the respondents answer the questionnaire after decision three, having got the results from two previous decisions. This means that learning behaviour when measured can be influenced by performance.

If we look to other sources, Phil Rosenzweig supports Iversen’s argument from a slightly different angle. He claims that many of the things we often think contributes to higher performance are actually attributions based on performance. This he labels as the halo effect (Rosenzweig 2007: 64). He also claims that retrospective self-reporting is commonly biased by performance (Rosenzweig 2007: 119). On the basis of previous performance, we make attribution about things like culture and leadership, or learning behaviour. In a self-reporting study like this, what we get is what the respondents think of their own behaviour seen in retrospect, not necessarily how they actually behave. According to Rosenzweig, their responses are very likely to be influenced by previous performance, which in the case of the simulation are the two previous decisions of which they have got the results.

Again, I’m not arguing against his point, but this can not be the case when there is no previous performance to make attributions from.

In this study, I will examine the relationship between learning behaviour and performance, and causality is a part of this. However, the questionnaires are handed out and answered after the respondents have gotten feedback on their performance in the two first decisions in the simulation. This means that the study is not designed in a way that can prove or disprove Iversen's findings. But when I at a later stage in the paper come to the discussion around causality, the point made above is of interest.

2.3 The concept of strategy

The second main part of theory deals with strategy. Strategy is a widely used term, about which you can find thousands of books and millions of entries on the Internet, and strategy consultancy is big business, with several firms specialising on advising on the subject (Pfeffer and Sutton 2006: 135). But even if the term strategy is seemingly both widely used and important, an examination of the literature reveals many different and even conflicting definitions, and there is no widespread agreement on a definition (De Wit and Meyer 2004: 3). In many ways, this confusion around the term strategy can seem to be parallel to the confusion around *the strategy* in many organisations.

Instead of starting with a definition, we can start with look at different perspectives on strategy. De Wit and Meyer (de Wit and Meyer 2004: 5, for example, suggest three dimensions of strategy:

- Strategy process: The way in which strategy becomes.
- Strategy content: The product of the strategy process.
- Strategy context: The context for the strategy process and the strategy content.

Since the simulation from where the empirical data comes is conducted in an environment where context is controlled and of little importance, we will leave the context dimension out of the discussion. That leaves us with two dimensions, which we will look more closely into.

If we juxtapose the first two dimensions with two ways of seeing strategy proposed by Michael Porter, we might see more clearly what it means. According to Porter, “the reason why firms succeed or fail is perhaps the central question in strategy” (Porter 1991: 95). He goes on to say that even if there has been a substantial progress in the development of frameworks that can explain the causes of superior performance at any given point in time, there has been considerably less development in our understanding of the dynamic process behind this superior performance. He labels the causes of superior performance at a given point of time the cross-sectional problem, and the dynamic process by which these causes are created the longitudinal problem (Porter 1991: 95-96).

Even if I’m not sure if this is exactly what Porter means, it makes sense to me to liken the cross-sectional problem to the strategy content, and the longitudinal problem to strategy process. For an organisation to achieve superior performance, the strategy content would have to “right” in the meaning that it would have to inhabit the causes that will produce the superior performance. But since the world changes over time, so does the strategy. If the content is to be “right” over time, the organisation would have to have a process in place that ensures this.

Later on in the paper, we will look at two different ways of seeing strategy, which can be labeled as a traditional view and a modern view of strategy. If, for example, one within the traditional view sees strategy as consisting mainly of planning, then that planning would be what De Wit and Meyer calls strategy process. If, on the other hand, one sees strategy as learning, as within the modern view, the strategy process can be seen as a learning process.

If we looked into one of the best performing teams in the simulation to see what the cause of their superior performance was, a cross-sectional answer to the questions of causality could for example be that they have a better product offering at a lower price and their competitors, that is, their strategy content is better. A longitudinal answer could, within the traditional view be that they have a better planning process, and within the modern view that they are better at learning from their actions. For both views, the strategy process is found to be better than their competitors.

One or supplementing school of thought to strategy process comes from the strategy-as-practice literature. According to Johnson et al, strategy is often explained in terms of

outcomes of what goes on in organisations, instead of the activities from which they formed. The strategy-as-practice literature focus on these activities, and sees strategy as something people do as opposed to strategy as something organisations have (Johnson , Melin and Whittington 2003: 3-14). They think of strategizing in the meaning of “how people go about the process of making strategy” (Johnson et al, 2007:27; Whittington and Melin, 2003). Johnson, Melin and Whittington argue for a shift in the strategy discussion, focusing more on the day to day processes and practices of organisational life which relate to strategic outcomes. The focus should move towards the activities often left out of traditional strategy research, but which nonetheless can have significant impact for organisations (Johnson, Melin and Whittington 2003: 3).

We see that within strategy-as-practice, they want to shift the focus from strategy as something organisations have to the activities forming the strategy. If we compare this view with that of Porter and De Wit and Meyer, we see that they encouraging a shift from a focus on strategy content to strategy process, or from cross-sectional to longitudinal.

One question when it comes to strategy both in general and in the business simulation, is what it takes for a decision or action to be strategic. In organisational life and to some extent in the simulation, there are decisions and activities being undertaken all the time, all of which can not be strategic. We have already seen from Porter that the reasons for success or failure of an organisation is a central question in strategy, and we can deduct that causes of superior performance is another central question. So for a decision or action to be strategic, it has to have something to do with the success or failure of the organisation.

For continue this thought, Andrews claims that a strategic decision is one that has long term effect, impacts the organisation in many different ways, and focuses and commits a significant portion of its resources to achieve the expected outcome (Andrews 2004: 71). So for a decision to be strategic, it has to do with long term success or failure, it has to have widespread impact on the organisation, and it has to be of some magnitude when it comes to resources.

Further, according to Pfeffer and Sutton, the basic purpose of strategy is deciding what to do, and not at least what not to do, to focus the organisations resources on a smaller number of projects or initiatives, and through this increase the likelihood of success. According to them,

strategy traditionally rests on two assumptions. Firstly, that a company will be better suited to doing some things than others, and secondly, that resources are limited (Pfeffer and Sutton 2006: 137-148). So we can add to the requirements for a decision to be strategic that it also has to do with prioritising activities and focusing resources.

In the simulation, the teams have to make decisions about things like for example which customer segments to target, which products to offer as well as pricing and risk strategies. They have to prioritise between these customer segments and products, and they have limited resources which they have to prioritise the use of. They compete over several rounds, so for a decision to be strategic it would have to have consequences on longer term, and it would potentially have a significant impact on the team's overall performance. Typically, a decision made in the earlier round of the simulation could be seen as strategic if it is made on the premise that it will have a significant impact on the performance of the team at the end of the simulation.

The final part in this introduction to the strategy theory is the issue of implementation, or execution which it is also called. As we have seen in the introduction, and as we will come back to later on in the paper, implementation is by many seen as a central problem for organisations. The issue is that the strategy does not get implemented, meaning that what organisations say they will do is not actually done.

This adds another dimension to those previously mentioned. It is not only about the strategy content that as the result of the strategy process; it is also a question of implementing the strategy content.

This paper is concerned with the strategy process, meaning the way in which strategy becomes, or the process by which the causes of superior performance are created. It will focus on what people can do, instead how the strategy should be. Unfortunately, it was not possible to measure the quality of the strategy content directly in the simulation, but influenced by Porter we can say that since the content of the strategy are made up from the strategic decisions that causes superior performance at any given point in time, we will assume that the teams with superior performance have be best strategies. We will therefore assume that improved quality can be best measured by the performance of the team.

So it is my goal to show that certain behaviours and activities can lead to a better strategy content and implementation, and by that better performance.

2.3.1 A traditional view of strategy

In the following, I will start by looking at what we can call a traditional view on strategy. The traditional view of strategy would emphasise planning, and also analyses. It would be seen as linear process of planning first and then implementing, with the plan meant to last for a few years. Then, a new strategy would be formulated. This traditional way sees strategy as a mainly rational logical process (de Wit and Meyer 2005: 6-7).

Another definition comes from Wright et al., who are quoted by Mintzberg et al. as claiming that strategy is “top management’s plan to attain outcomes consistent with the organisations missions and goals”. Mintzberg et al. further claims that most standard textbooks offer this definition on strategy. Within this view of strategy, it is seen as a formal process of analyses and planning, meaning that strategy is a conscious, intended and forward looking course of action, where the actual making of the strategy is seen a process of formal planning (Mintzberg, Ahlstrand and Lampel 1998: 5-9), and the realization of strategy is a process of imposing this formal strategy through a process of implementation, assuming that strategic intentions and the plan for achieving them will not be challenged on the course of implementation (Overmeer 1996: 253).

In line with this, Mintzberg describes what he calls the planning school of strategy, which is based on the following:

- The formulation of strategy should be deliberate, conscious and formalized, and done as a sequential process with distinct steps.
- Strategies formulated through this process come out fully developed and explicit, so that they can be communicated and implemented according to the implementation plan (Mintzberg 2000: 42).

Within the planning school, strategy making itself is planned and happening according to a predetermined schedule (Mintzberg 2000: 241). As if breakthrough ideas happens once a year in October, on demand. If you get one in March, you will just have to hold on to it and hope it is still valid in October (not to say January next year, when implementation is supposed to begin). Or as Mintzberg quotes Anthony (1965): “New ideas do not originate according to a timetable” (Mintzberg 2000: 241).

According to these definitions then, strategy is the task of top management, and it is a plan to achieve the goals the organisation has. It is done through a formal sequential process of analyses and planning, followed by implementation. Once decided upon, the strategy and the implementation plan would not be changed. Within this view, the opportunity to question the strategy would be very limited once it has been formulated.

Stereotypically, it is often spoken of as a group of top managers going a way off-site, where they, equipped with all kinds of analyses of the company, the market and the future, comes up with “the strategy” which they would then hand over to the rest of the company to implement.

The model below shows this way of thinking about strategy. First the strategy would be formulated, then a plan for its implementation would be made, and then the actual implementation would take place. At the end, the realized strategy, which is the outcome of the strategy, would be what was planned in from the beginning.

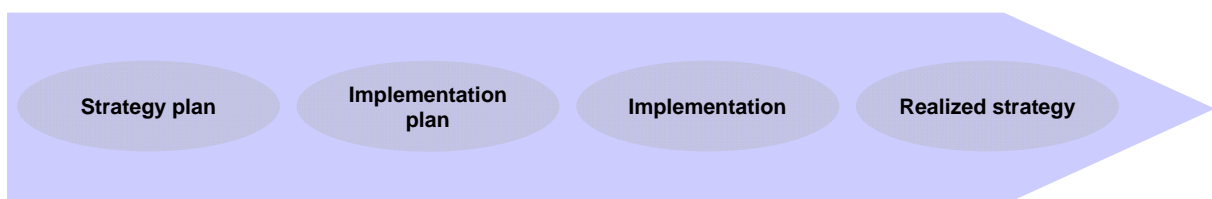


Figure 9: A traditional view on strategy

Since there is only one management level in the simulation, the issue of who is responsible for the formulation of the plan is not relevant for this study. If we put the rest of this view into the context of the simulation, it would mean that the teams would make their analyses and

formulate a strategy on the outset of the simulation, then make a plan for its implementation and stick to this more or less throughout the simulation.

2.3.2 A modern view of strategy

The traditional view of strategy, prescribes strategy as a deliberate and rational process of planning. But the question is: Is strategy always deliberate? Researchers, who started looking at the strategy process, found that significant strategic changes rarely came from formal planning efforts, or from the top management. Most often, it came from a variety of little actions and decisions taken throughout the organisation. Over time, these actions and decisions lead to major changes in direction (Mintzberg, Ahlstrand and Lampel 1998: 177-178). In a complex and ever-changing world, there is no reality that can be analysed and put together into a final picture. The many and subtle interrelationships inside and outside a company makes it hard to know the exact outcome of actions (Rosenzweig 2007: 148). As circumstances changes, members of organisations will often be compelled to make real time moves in response to this. These moves might turn out to be inconsistent with the intended strategy in a way that the traditional approach does not explain (Overmeer 1996: 256-257).

The modern view, exemplified by the work of Henry Mintzberg, describes a process of strategy making that takes the form of interplay between deliberate and emergent processes (Overmeer 1996: 251). This view of strategy dismiss the traditional view, stating that strategy is a much more messy process with formulation and implementation activities going on constantly, intertwined with one another. In this view strategy is not formulated first and then implemented, but rather it is done in incremental steps of thinking and acting, strategies emerging as they go along (de Wit and Meyer 2005: 7).

Within this modern view of strategy, strategy is seen more as a continuous, iterative process of formulation, emergence and implementation. Since the world is not stable and predictable, plans do not always work out, and new actions and decision made in response the changing circumstances might lead to new strategies emerging.

On the other hand, stating that the traditional view of strategy is problematic does not mean that planning should be abolished. Research into the importance of formal strategic planning has during the years has produced different results, with some describing the effect of formal planning on economic performance as both tenuous and weak, and others concluding that strategic planning positively influenced performance (Brews and Hunt 1999: 889-890). In their own study, Brews and Hunt concluded that formal strategic planning is important, but that it can co-exist with more emergent processes (Brews and Hunt 1999: 906).

If you ask senior executives with responsibility for creating strategy, they would maybe claim, and probably wish, that intended and realized strategy were the same, that is, that the planned strategy was actually realized. But as we have seen, this is rarely the case. One thing is that planned strategy might not be realized. Another thing is that unplanned actions might occur, and that these actions might display a pattern over time. This is what Mintzberg et al. calls emergent strategy, which is when a realized pattern of actions was not explicitly intended (Mintzberg, Ahlstrand and Lampel 1998: 11).

The model below shows a way of thinking about strategy in line with the modern view, which shows the interplay between deliberate strategy, or planning if you like, and emergent strategy. To explain the model, we can go through it step by step:

1. Intended strategy. This is the formal, explicit strategy.
2. Implementation. This is where the formal strategy gets implemented.
3. Deliberate strategy. Intentions that are fully realised can be called deliberate strategies.
4. Unrealised strategy. Intentions not realised at all can be called unrealised strategies.
5. Emergent strategy. Where a pattern realised was not expressly intended, this is called emergent strategy.
6. Realised strategy. This is the combination of deliberate strategy emergent strategy.

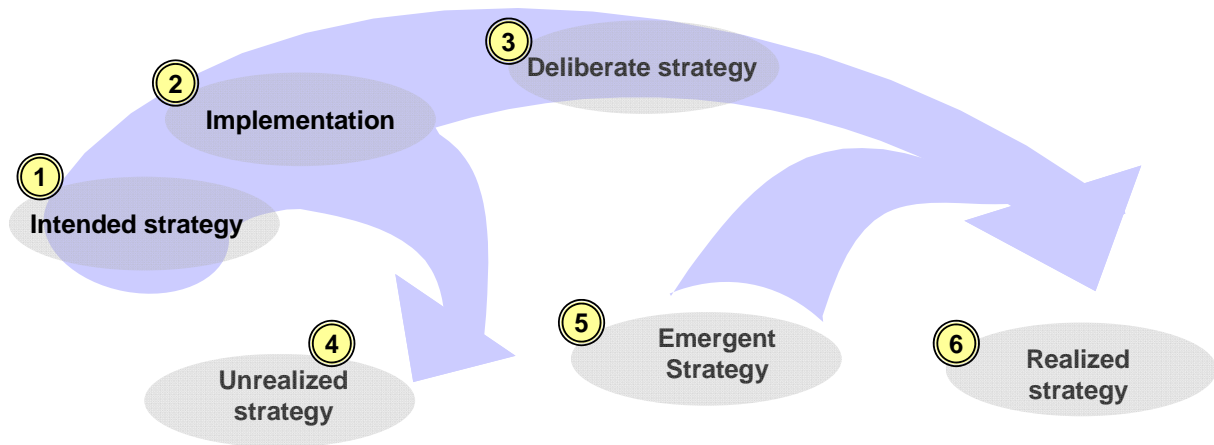


Figure 10: The modern view of strategy. Adapted from Mintzberg, Ahlstrand and Lampel 1998: 12

It is hard to envision an organisation where top management does not impose some sort of intention and no control over the strategy process. But it should (hopefully) be just as unlikely to imagine an organisation where people engage in no learning on the way. So almost every real-life strategy process is a combination of deliberate intention and emergent learning (Mintzberg 2007: 5). This is also in line with Brews and Hunt's findings, that both types of processes can co-exist (Brews and Hunt 1999: 906).

This study is not about determining what is "best" of intended strategy or emergent strategy, but rather to find out how to improve the strategy process as a whole, encompassing both intended strategy and emergent strategy. So how can we describe the process so that we can understand how we can improve it?

2.3.3 The learning school of strategy

One way could be to describe the strategy process a form of learning. According to Mintzberg, empirical research has shown us that strategy formation is a fundamentally dynamic process that is best described as a form of learning (Mintzberg 2000: 241), and Argyris and Schön argues that effective strategy now seems to be requiring continuous development of new understanding, models and practices, with the focus on the interaction of planning and implementation explicitly described as organisational learning (Argyris and Schön 1996: 182).

The previously mentioned concept of emergent strategy makes strategic learning possible, because it recognizes the organisation's capacity to experiment. Good ideas, which could become good strategies, needs to be tried out. When actions are taken, feedback can be received, and from this can we learned what works and what doesn't (Mintzberg, Ahlstrand and Lampel 1998 : 189-190). As we have seen, members of organisations will often be compelled to make real time moves in response to changing circumstances. Through these real time moves, people learn about the situation as well as their organisations capability of handling it. As these moves converse on patterns of behaviour that works, strategies emerge (Mintzberg, Ahlstrand and Lampel 1998 : 176). When it comes to the intended strategy, the limitations of it can only be discovered when the actions are taken, and it is through this kind of strategic leaning an organisation can find out what its strengths and weaknesses are (Mintzberg 2000: 276, 286).

Mintzberg et al. calls this way of seeing strategy as learning as the learning school of strategy. They propose some premises for the learning school:

- The complex and unpredictable nature of an organisations environment makes deliberate control impossible. Strategy making must therefore take the form of a learning process, where formulation and implementation become indistinguishable.
- Learning emerges through behaviour that stimulates backward-looking thinking, so that it becomes possible to learn from what has happened. Strategic initiatives can arise in many ways and from anyone with the capacity to learn. These initiatives create

streams of experiences that can converge into patterns that can converge into strategy. When these emergent strategies become recognised, they may become deliberate.

- The role of senior management thus becomes to manage the process of strategic learning, not to preconceive deliberate strategies.
- Thus, strategies appear first as patterns of the past, then maybe as plans for the future (Mintzberg, Ahlstrand and Lampel 1998 : 208-209).

Within this way of seeing strategy, the strategist is as a learner who manages a process where both intent and emergence has its place (Mintzberg 2007: 376). Anyone can learn themselves into strategies, action by action and decision by decision (Mintzberg 2007: 5). The key to managing strategy is to detect emerging patterns and help them take shape (Mintzberg 2007: 379)

In terms of the simulation, it is by implementing the strategy and get the results of their decision, and by experimenting, they come to learn about the environment they operate in, and what parts of their strategy that works and what doesn't. It is by opening up for the possibility that strategy can emerge they can allow their intended strategy to be influenced by it. It is through this kind of feedback they can revise their strategy in a way that allows them to increase their performance.

The model below shows the previous model, with the addition of a feedback loop (or actually, several feedback loops), which are as follows:

7. From realised strategy to intended strategy. Learning what works which feeds into the formal strategy, and causes changes to this.
8. From realised strategy to emergent strategy. Learning what works and what does not which gives new knowledge to be utilised to improve how one works with emergent strategy
9. From unrealised strategy to intended strategy. Learning what does not work which feeds into the formal strategy, and causes changes to this.

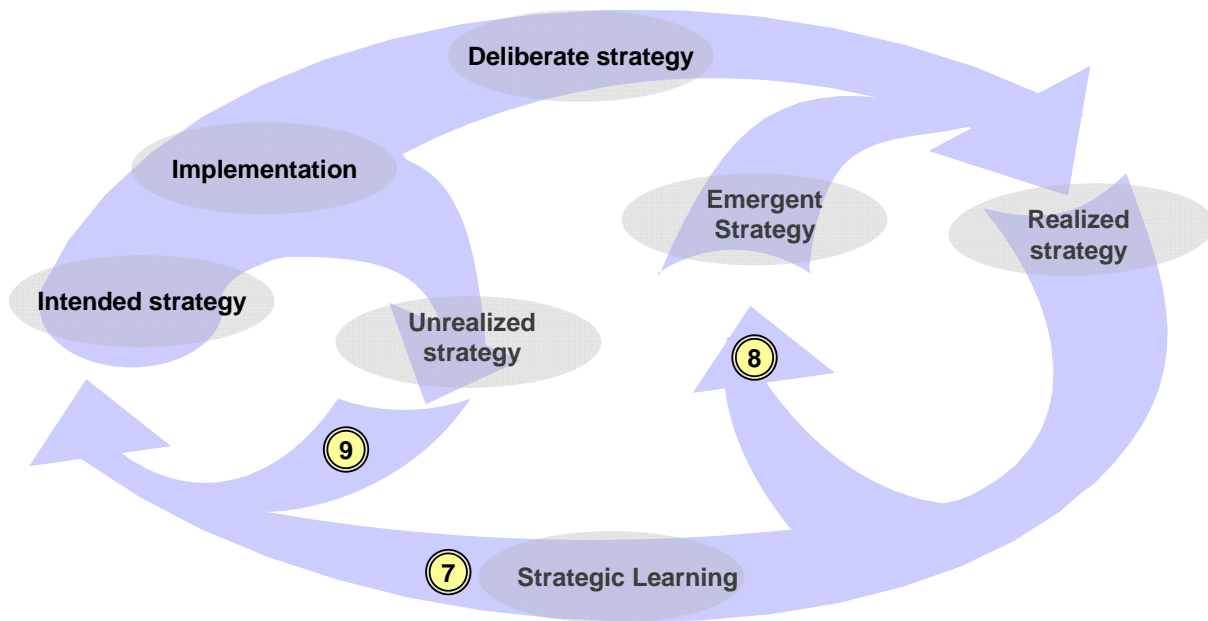


Figure 11: Strategy as learning. Adapted from Mintzberg, Moncrieff and Ashridge Consulting

2.3.4 Strategy as a probe into the environment

To further the thinking from the previous chapter, we turn to Wim Overmeer (1996), and a process of strategy making that includes realization as well as intent. According to him, the interaction between the members of the organisation and the environment can be described as a strategic “conversation” between the firm and its environment. This can be called reciprocal experimentation, in that each action by the organisation elicits feedback from its environment (Overmeer 1996: 256-258).

Members of organisations who are part of such a strategic conversation will often have to make real time moves and responses to changing situations which turn out to be inconsistent with the intended strategy in a way that the rational approach does not explain. Inconsistent and incomplete actions may have consequences for the organisation that have to be assessed and interpreted through an organisational process which can be called strategic learning (ibid).

In situations as listed above, the implementations and realisation of strategy should be framed as a probe into the corporate environment (ibid).

The implementation of strategy therefore involves a second order design process: not only should the design of an intended strategy be considered and tested as a hypothesis about the organisations environment, but the resulting implementation of strategic actions should itself be treated as a probe into that environment, which can reveal new information about that environment and about the underlying assumptions of the formulators of the strategy. In this way, the reframing of the strategy process begins to undo the dichotomy between strategy formulation and strategy implementation, or between intended and emergent strategy, through seeing implementation and realisation as exploratory probes (ibid).

Framing the realisation in this way, means that organisations should not only impose their intended strategy on a given situation, but should also remain open to new information from and about the environment that may require changes the strategy. To accomplish this, it is important for organisations to

- Seek information to test, and disconfirm, their assumptions and reasoning about the organisation and its environment
- Seek information to test whether the organisations implementation actually realise strategy
- Pursue new opportunities that emerge or challenges that presents themselves to get information that could lead to changes in strategy (ibid).

This way of seeing strategy is different from seeing it as just enforcing strategic intent through rigorous implementation, in which intent is seen as a given once it has been formulated, or as just adapting to changes through trial- and-error learning, where intent is apparently ignored. Both of these approaches have in common the assumption that new information will not challenge explicit or implicit intentions. This may cause organisations to ignore information that reveals mismatches between intention and realisation. The idea of strategy as a probe into the environment tries to challenge this assumption by opening up for the possibility that intended strategy and how organisations think about its implementation can and should be challenged (ibid).

Strategy as a probe into the environment requires organisational inquiry through a continuous and reciprocal process of strategy formulation and implementation. To create an organisation open to organisational inquiry and able to learn strategically, organisations should create an environment in which:

- Tacit knowledge is made explicit, so that their ideas can be tested rather than withheld.
- Questions about the strategy and the implementation are surfaced, instead of contributions and concerns being withheld.
- Evidence that can disconfirm assumptions and reasoning and lead to new information about the environment is sought after (Overmeier 1996: 259).

So, my assertion is then that with an improved strategy process, both the intended and the emergent strategy will improve, which again will lead to a better realized strategy. By improving the planning process and facilitating the emergence of new ideas, the realized strategy, which is the content part of the strategy organisations actually succeed in carrying out, will be better from a cross-sectional point of view.

2.3.5 Creating the preconditions for emergence

When we turn to Hamel, he emphasises the importance of creating the right preconditions for strategic insight to occur, and doesn't believe the emergent nature of strategy creation should prevent us from aiding the process of strategy innovation. This is because strategy does not simply emerge, but rather, it is emergent. By creating the right preconditions, we can aid and encourage emergence (Hamel 1998: 10-11).

Through this, we could maybe we make the way from insight to strategy less difficult. Maybe we could improve the chance of insight occurring and the being converted into action, maybe we could make serendipity happen (Hamel 1998: 12).

The insights on how to create these preconditions will according to Hamel not come from the traditional strategy disciplines themselves, but from concepts like cognitions and organisational learning. Hamel proposes five preconditions for the emergence of strategy:

- New voices
- New conversations
- New passions
- New perspectives
- New experiments

The last point is of special interest, since he mentions specifically launching experiments as one of the roots of strategy creation is, which will maximise the organisations rate of learning about which strategies that work and which that won't (Hamel 1998: 12-13).

I suggest that one of the preconditions for strategic insight to occur more often could be learning behaviour. Through an increased level of learning behaviour, we can increase the odds of insights occurring, and through that again, the quality of strategy.

2.3.6 Implementation

An area of importance that is not grounded so well in the theory this far in the paper is implementation, since it is part of the hypothesised model, the area needs some attention.

In the introduction to the paper, I referred to Kaplan and Norton (2005), stating that, on average, 95% of a company's employees are unaware of, or do not understand, its strategy, and Walter Kiechel (in Mintzberg 2000) who states that only 10% of formulated strategies actually got implemented. But more authors have expressed their concern with implementation, or as it is also called, execution.

According Bossidy et al, the biggest problem facing organisations is that they fail to deliver what they promise. This is not because of the strategies by themselves, but rather because they

are not executed well. (Bossidy et al. 2002: 14-15). According to Hrebiniak it is execution, not formulation that is the biggest challenge of strategy. He goes on to quote a study that research comprised 160 companies over a five year period, where it was found that success was strongly correlated with good execution (Hrebiniak 2005: 1-27). So not only is implementation something many organisations struggle with, it is also a success criteria for those who are good at it.

I have already described double-loop learning and that within an organisation capable of double-loop learning, it is at least possible to question the strategy if implementation fails.

According to Beer and Eisenstat, it is a lack of openness, not being able to talk openly about problems, which is common in organisation, that lies behind many failures to implement strategy (Beer and Eisenstat 2004: 5). So what can be done to improve implementation? In this study, the hypothesis regarding implementation is that increased levels of learning behaviour will lead to increased levels of understanding, commitment and implementation. So Beer and Eisenstat's statement supports this. Bossidy et al. (2002) is in line with this, writing that the key to execution is the quality of the dialogue. Dialogue is the basic unit of work, and how people talk to each other determines how well the organisation will function. To surface reality, the dialogue has to be candid, raising and debating the right questions. In addition, one has to be able to listen as well as talk (Bossidy et al. 2002: 25-29).

According to Pfeffer and Sutton, the one powerful lesson to be learnt from the strategy literature is the importance of people understanding what they are supposed to do (Pfeffer and Sutton 2006: 153), and Dooley et al. found that the level of consensus regarding a decision will increase the level of commitment to the decision, and that decision commitment in turn will increase the probability of implementation success. Consensus is promoted by task-related conflict in decision processes by enhancing understanding in the decision group. Consensus is defined as agreement in the group that the best possible decision has been made, and is enhanced since decision makers feel that differing points of view and relevant issues have been addressed (Dooley, Fryxell and Judge 2000: 1237 – 1254)

So from this, I deduce that to improve implementation, openness and dialogue will improve understanding, which in turn will improve commitment, which again will lead to better implementation.

2.3.7 Critique of the modern view of strategy

We have presented a modern view of strategy, characterised by emergence and learning. But could there be any downsides to this way of thinking?

First of all, it is the risk of having no strategy at all. If we go too far, and focus only on emergence and learning, and not on the intended, formal strategy, central direction can dissolve into tactical manoeuvring. This can in turn lead to the very disintegration of strategy, with the organisation being purposeless, suffering from a clearly articulated strategy. To quote Mintzberg et al., who in turn quotes Gaddis (1997), who

“ refers to the Roman general Varro, who was “an early instrumentalist...who ‘did not need any strategy’”. He took his superior force into a battle against Hannibal (who had a strategy of the ‘weak center’) and suffered a devastating defeat. Gaddis concludes (with more than a touch of sarcasm): ‘Apparently a suitable strategy for the Roman army failed to ‘emerge’ as the battle wore on’” (Mintzberg, Ahlstrand and Lampel 1998 : 223-25).

So the focus on emergence could be taken too far, if it goes all the way to having no strategy at all, and therefore no direction.

Another danger is that focusing too much on learning might undermine a coherent and perfectly viable strategy, with people experimenting and championing initiatives simply because they are new or more interesting, and in this way leaning away from what works. This can be called strategic drift, with the organisation gradually and incrementally, without anyone really noticing, drifting away from its established strategy. This is not what the learning school should be about. It is not learning for the sake of learning, but learning as a way of elaborating a valued sense of direction, an established strategic perspective, and occasionally changing that sense of direction, when necessary. Also, people can not only learn, they also have to get on with doing the regular work efficiently. What one has learned has also to be utilised (Mintzberg, Ahlstrand and Lampel 1998 : 226-228).

So learning has to take place for the sake of the organisation, not for the individual members to engage in new and interesting activities experiments. Mostly, learning will be a way of developing the strategy within the direction the organisations is already heading.

Sometimes emergent strategies could be strategies that no one ever wanted or intended. Sometimes little decisions leads to big undesired strategies and consequences (Mintzberg, Ahlstrand and Lampel 1998 : 227).

Within the simulation, there could be the danger of the teams ending up with only emergent strategy, and therefore no direction, and with participants pursuing initiatives and experiment for the sake of their own interest instead of contributing to the strategic direction of the team. Emergence could also lead to unwanted strategies, when the accumulation of small decision leads to big undesired strategies and consequences.

2.3.8 What counteracts organisational learning?

So far we have seen that organisational learning and learning behaviour as described earlier, will improve performance. In many ways, it seem obvious that openness and good discussions is beneficial, and I believe most people would agree in principle. But what could be the reasons for it not happening?

Even if organisational inquiry is to some degree going on in practice, it is not nearly as obvious as we tend to assume. Here, the theory-of-action perspective on organisational learning can be helpful. The theory-of-action perspective predicts organisational members likely to experience organisational inquiry as potentially threatening and embarrassing, which in turn tends to trigger individual defences and lead to Model I behaviour (Overmeer 1996: 259-260, Argyris and Schön 1996: 92).

We have already discussed Model II behaviour and it most important parts, valid information and free and informed choice. Model II behaviour can increase the likelihood of double-loop

learning to occur. Model I behaviour, in contrast, is about protecting yourself, not paying attention to your impact on others, suppressing feelings, blaming others and a lack of trust, which is due to (Argyris and Schön 1996: 93). This can also be called organisational defensive routines. These are actions that are intended to protect individuals, or organisations, from experiencing embarrassment or threats. The way this happens, is by talking and acting inconsistently, but pretending to do the opposite, and at the same time making the inconsistency undiscussable (Argyris and Schön 1996: 99-100).

In the simulation, this would mean that if participants in the simulation feels threatened by organisational inquiry, say because they are afraid to say something wrong or be exposed as not competent, it may trigger defensive routines, where the participants communicates unclearly and are not willing to share any thoughts on why they communicate or act as they do.

This also links to the use of learning behaviour, for which a central problem is that people find initiating learning behaviour a risk, for example by appearing incompetent by admitting an error or asking for help. Asking for help, admitting errors and seeking feedback are examples of behaviours that people avoid in order to escape embarrassment, even if doing so would provide benefits for the team (Edmondson 1999: 2).

Also, it links to double-loop learning, because this depends on the exchange of valid information and the public testing of assumptions. With Model I behaviour, double-loop learning is discouraged (Argyris and Schön 1996: 96). With Model I behaviour, there is little public testing of underlying assumptions, meaning that decisions will be made on untested assumptions (Argyris and Schön 1996: 95). This will again have a profound effect on the organisations ability to realize its strategic intent and engage in strategic thinking (Overmeier 1996: 255).

So the participants in the simulation, if exhibiting Model I behaviour, minimise the chance of double-loop learning occurring, which in turn means that decisions might be taken under the wrong assumptions, which in turn will impact the teams ability of thinking strategically and implementing the strategy.

2.4 Learning behaviour, strategy and performance

In the following, I will describe the relationship between learning behaviour, strategy and performance with basis in the theory I have just gone through. I start with the relationship between strategy and performance.

2.4.1 Strategy and performance

When describing the theoretical model, I made the assumption that strategy is important for an organisations performance, meaning that improved quality of the strategy content would lead to improved performance. But is this the case?

To start with, we can go back to what I said about strategy is a widely used term, with thousands of books written and several firms specialising on the subject. So face value seems to support the assumption: Whys would there all this interest in the subject if it didn't matter for performance? Why would organisations bother having them?

There is also research supporting the assumption. Brews and Hunt found that formal strategic planning is positively related to performance (Brews and Hunt 1999: 903), and according to Heracleous, research has shown that an organisations strategy is the most important determinant of its performance (Heracleous 2003: 4).

But there is also indication to the contrary. Pfeffer and Sutton claim that empirical research shows a weak link between strategic planning and performance (Pfeffer and Sutton 2006: 136).

But they also state that one of the reasons for this is that this relationship is difficult to study (Pfeffer and Sutton 2006: 138), and that having a clear strategy is important for producing

focus and communication and coordination within an organisation (Pfeffer and Sutton 2006: 143-144).

It is not possible to determine this relationship within the context of this study. The only measure I have on the quality of the strategy is the teams' performance. Since there is some evidence that strategy *is* important for performance, and since I have not found any evidence able to rule out the relationship, I will hold on to my assumption.

2.4.2 Learning behaviour, strategy and performance: A model

To sum up this theory chapter, and describe the relationship between learning behaviour, strategy and performance, it is time to go back to research question 1:

What is the relationship between learning behaviour, implementation of strategy, quality of strategy and performance? Does increased use of learning behaviour increase the use of both implementation factors and quality factors? And will an increased level of implementation factors and quality factors lead to improved performance?

The hypothesised model looks like below.

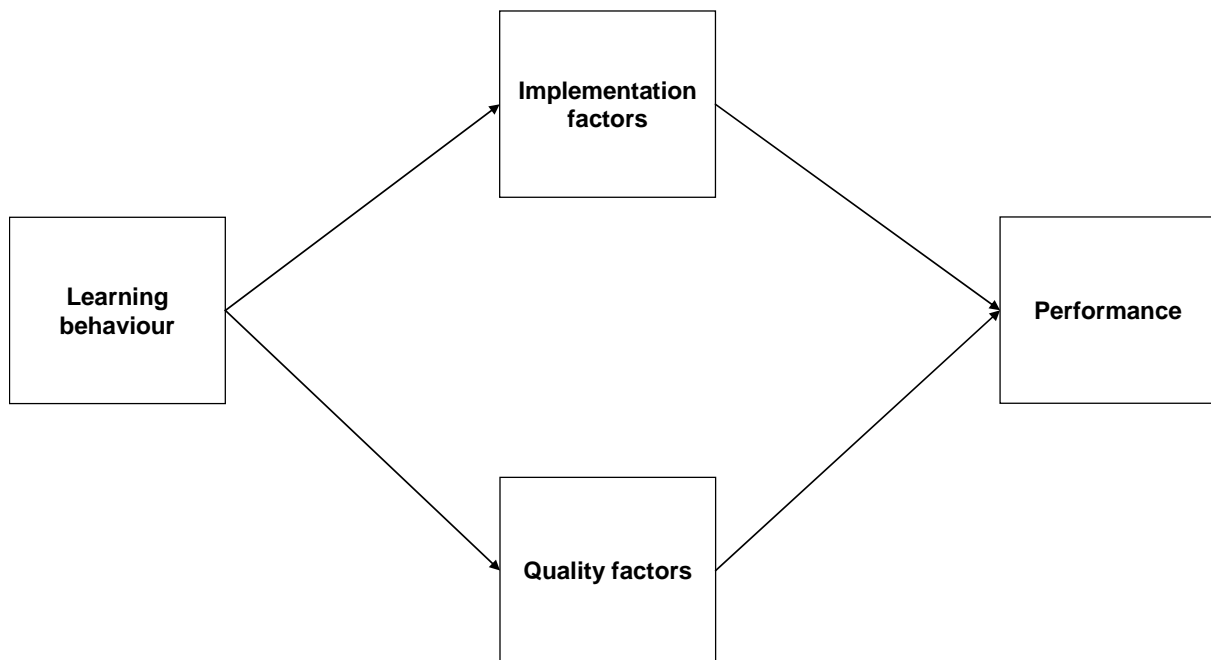


Figure 12: Research question 2: Does increased use of learning behaviour increase the use of both implementation factors and quality factors? And will an increased level of implementation factors and quality factors lead to improved performance?

The relationship is theoretically based on the assumption that learning behaviour acts like an enabler for strategy, with a higher level of learning behaviour increasing the level of quality and implementation. So how does the theory fit into the model?

If we put the questions regarding implementation and quality into the model adapted from Mintzberg et al, and adds learning behaviour as an underlying driver, the model will look like below.

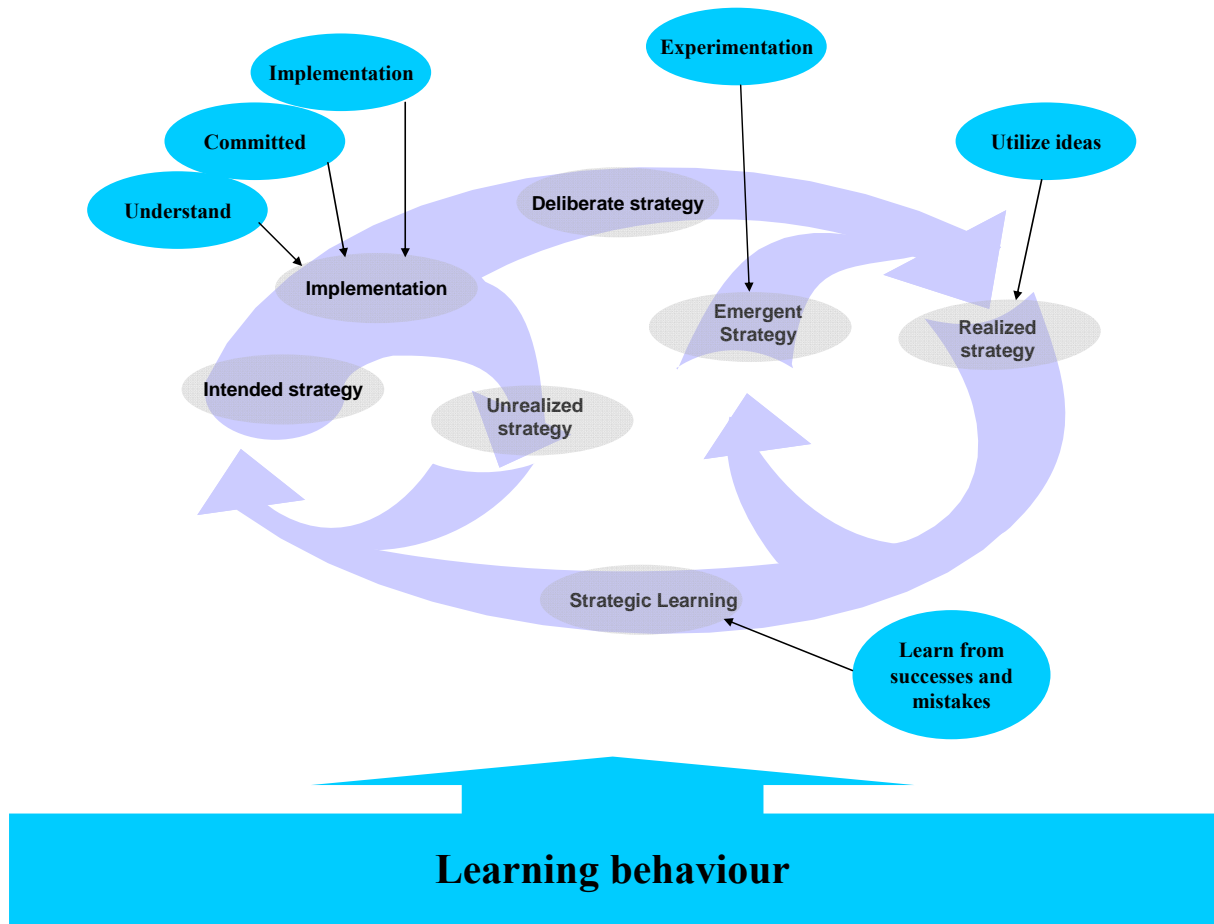


Figure 13: Learning behaviour as a driver for Strategy as learning. Adapted from Mintzberg, Moncrieff and Ashridge Consulting

In the model, learning behaviour is represented by questions like to which degree they have good conversation, express the reasoning behind their viewpoints and ask for the reasoning behind others team members' viewpoints. These behaviours are assumed to increase the possibility of learning, and allow the team to adapt and improve.

Quality factors are represented by question about experimentation, ability to utilise ideas and ability to learn from mistakes and successes, and are assumed to improve the quality for the strategy.

Implementation factors are represented by questions about understanding of the strategy, commitment and implementation, and are assumed to improve the implementation of the strategy.

Since learning behaviour is seen as the underlying driver, I will start there. Hamel emphasises the importance of creating the right preconditions. Through this, we could make the path from insight to strategy less difficult, and improve the chance of insight occurring. The insights on how to create these preconditions will according to Hamel not come from the traditional strategy disciplines themselves, but from concepts like cognitions and organisational learning. One of the things he mentions specifically as one of the roots of strategy creation is launching experiments, which will maximise the organisations rate of learning about which strategies that work and which that won't.

Hamel's preconditions could be learning behaviour. Through an increased level of learning behaviour, we can increase the odds of insights occurring, and through that again, the quality of strategy.

We have also seen that Mintzberg et al. describe the strategy as a process that is best described as a form of learning, and that Argyris and Schön argues that effective strategy requires a process described as organisational learning.

Mintzberg et al. emphasises the need to experiment, learn from what has happened and states that the key to managing strategy is to detect emerging patterns and help them take shape. This focus on experimentation is also supported by Overmeer, who also writes that each action by the organisation elicits feedback from its environment, and that organisations should remain open to new information from and about the environment that may require changes the strategy.

Overmeer's idea of strategy as a probe into the opens up for the possibility that intended strategy and how organisations think about its implementation can and should be challenged. This is similar to double-loop strategising, in which organisations can question just this.

This fits very well in with the questions regarding quality. In addition, since learning behaviour according to Edmonson can help the organisations' members to detect unexpected consequences, and since learning behaviour can increase the likelihood of double-loop learning, it also links to learning behaviour.

On the implementation side, Bossidy et al. claims that execution is the quality of the dialogue, and that to surface reality, the dialogue has to raise the right questions.

Also, Dooley at al. found that consensus regarding a decision will increase the level of commitment to the decision, and commitment in turn will increase the probability of implementation success. Consensus is promoted by task-related conflict in decision processes by enhancing understanding, which is enhanced because differing points of view and relevant issues have been addressed. In addition, Edmonson claims that learning behaviour can improve the members' collective understanding. This fits with the questions regarding implementation and learning behaviour.

3 Scientific method

In this chapter, the method for collecting and analysing data will be presented

3.1 Business Simulation as a training and learning context

Using simulations in research situations is not uncommon, and they have the benefit that they can recreate complex problems in a risk-free environment (Iversen 2006: 20). As stated in chapter 1, this business simulation is a simulated business environment, where teams of experienced managers compete in a business situation similar to that they normally work in. The business simulation is used as part of training programmes within the organisation. The teams compete against each other, and the main challenge is to formulate and implement a strategy better and faster than the competition.

The fact that they are explicitly asked to formulate a formal, intended strategy is important, in that this formulation is a major part of their task, which again therefore can be influenced by learning behaviour. The decisions they had to make comprise of for example which customer segments to target, which products to offer as well as pricing and risk strategies.

Throughout the simulation they go through several decision periods, where they formulate and implement strategy, and through this can learn about the business and the business environment.

3.2 Research design

This study gathers information from individuals using the business simulation. On one hand the training/learning situation with the business simulation consists of manipulation due to the fact that the environment and the tasks at hand are simulated, and also the time constrains and the context. However the survey is non-experimental, in that the researcher does not manipulate the situation and the independent variables (Lund et al. 2002: 265). This means that I have had to accommodate my research to the simulation, and not the other way around.

Learning behaviour, quality and implementation is measured by how the participants experience this, so we can not infer if the teams actually exhibited these behaviours and factors, only that they reported to have done so.

The simulation gives the opportunity to use performance as a dependent variable without having to adjust for external variables. Performance is only dependent on the decisions of the teams competing in the simulation.

3.3 Sample group

The sample group consists of mid level managers from a Nordic company, which also has operations in the Baltic countries and Poland. The respondents are mainly from Norway, Sweden, Finland and Denmark, and there are also a few from the Baltic countries and Poland. The participants in the simulation come from all parts of the company. Gender wise there was a slight majority of women, as the situation is in the company for this segment of managers. Both with regard to geography and business areas, the participants in the simulation are proportional to the distribution in the company.

The respondents are relatively experienced professionals, in the age range from approximately 30 to 55, with most being in the upper half of this range. Most will have higher education, typically a MSc in Economics. They have been chosen to participate in the simulation based on past performance and their potential for future performance and higher positions.

The respondents have all been nominated to participate in the simulation based on the needs of the company and the participants themselves, so I had no possibility of choosing a representative sample; I simply had to take what was there. This means that the sample is a non-probability, convenience sample – the sample includes the individuals “at hand” (Lund et al. 2002: 133). Sometimes termed an accidental sample, I selected the individuals convenient to select (Ghauri and Grønhaug 2005: 146). Still, with the before mentioned representation of different parts of the organisation, different countries and ages, I feel it is an approximate representation of the available population.

Each team within the sample group was composed in a way as to get the most even distribution on experience, geography and part of the organisation they work in order to limit the effect of demographic factors on the results in the simulation.

The sample consisted 14 teams, distributed over 4 different runs of the simulation. There was 72 respondents, and the response rate was 100%

3.4 *The questionnaire*

The questionnaire was developed in two steps. The first was to define the questions regarding learning behaviour. Here I chose to use the questions used by Iversen (2006) to be able to replicate her study on the relationship between learning and performance. Secondly, the questions regarding quality and implementation were developed based on the theory laid out in chapter 2.

All questions are on a five point Likert scale, ranging from “not at all” to “very much”. The variables are interval variables, consisting of mutually exclusive categories that are ranked, with equal intervals between the data points, which gives the opportunity of for the mathematical operation of calculating means and standard deviations (Schumacker and Lomax 2004: 24). It is discussable if the participants understand the variables to be

equidistant, but I think the symmetry and the use of a visual scale makes the case for the data to be considered as interval variable data.

The questionnaire uses terms and language which should be familiar to the sample group, and to make sure the questionnaire would be understood correctly, it was reviewed by both native English speaking and non-English speaking persons. The questions are listed below:

Learning behaviour
We express the reasoning behind our viewpoints
We seek the reasoning behind other team members viewpoints
We have a climate for expressing alternative viewpoints and challenging each other
We take the time to listen to each other
Each of us has the opportunity to speak their mind
We have good discussions
Implementation
We understand our strategy
We are committed to our strategy
We implement our strategic decisions
Quality
We have room for experimentation in our strategy process
We are able to utilize ideas emerging throughout the simulation
We are able to learn from our mistakes and successes

Table 1: Questions in the survey

3.5 Data collection

The main advantage of conducting a survey is that the data can be collected specially for this particular research project, meaning that it is consistent with the research questions and objectives at hand. It is also hard to learn about behaviours without asking the people involved. The data collection could also have been done through observation, but this would have required several observers to be present, something that was not possible.

The collection period was from April 2007 to October 2008. The collection was done by the researcher, and he was available at the simulation to provide instructions and answer questions.

The questionnaires were distributed to the respondents half way through the simulation, in the rooms where they had just completed their third decision of the total of six decisions. The questionnaire was not to be discussed, and was to be filled out right away and collected before they left the room. This so that they would not be influenced by each other, and to secure that everyone responded. Since the last decision was just made, they would not know the result from this decision, and could not be influenced by it. The reasoning for getting the data this early in the simulation is the same, to prevent the actual performance to influence their responses in the questionnaire. As we have seen previously in the paper, Phil Rosenzweig states that many of the things we often think contribute to higher performance are actually attributions based on performance. This he labels as the halo effect (Rosenzweig 2007: 64). He also claims that retrospective self-reporting is commonly biased by performance (Rosenzweig 2007: 119).

Rosenzweig refers to an experiment done by Barry Staw, then at the University of Illinois. Staw gave some groups a task, and afterwards told some of the groups that they had performed well and some of the groups that they had performed poorly, but did so entirely at random. The groups that were told that they were performing well described their groups in a more positive way, and those told they were performing poorly described their groups in a negative way, irrespective of how well the groups had actually performed. In fact, the “high-performance groups” and the “low-performance” groups had done equally well. Staw

concluded that people attribute characteristics to groups based on their belief in which groups are effective and which are not. Other studies affirm Staw's findings. According to Rosenzweig, this means that you can't measure group behaviour if they already know something about the outcome of the task at hand (Rosenzweig 2007: 53-55).

In this thesis, that means that the respondents' rating of group behaviour and strategy could be influenced by their knowledge of their performance in the simulation. In short, this questions the direction of causality. The hope is that the measures taken as stated above are sufficient to avoid the halo effect.

The respondents were given a short briefing about the survey in plenary before the third decision, and a covering letter with a short description followed the questionnaire. The briefing and covering letter explained the purpose of the survey, and participation in the survey was anonymous. I was present at all the simulations to secure the process and answer any questions, and the respondents were told that both they and the company would be kept anonymous.

A problem with a self-referential survey is of course that it is dependent on the participants' understanding of the situation and themselves, and that it is not "the truth" that is measured, but the different participants' perception of situation (Lund et al. 2002: 149). On the other hand, who would know better how the situation is than those actually experiencing it? Anyway, this was the only available method of data collection, as already stated.

Of course, there is a chance that the answers would be influenced by what is socially acceptable (Lund et al. 2002: 149). In this survey, the answers are anonymous and as mentioned above measures were taken to limit the respondents' influence on each other, but nevertheless, there is a possibility that this could be the reason why the answers are skewed to the more positive side of the scale. This could also be what Argyris calls defensive behaviour, namely that the participants rate their teams positively to avoid the embarrassment of surfacing bad team behaviour.

3.6 Initial analysis: missing, normality and consistency

The sample consists of 72 people, and the questionnaire of 12 questions. This means that the total of data entries is 7864. Out of this, I have three missing values items, constituting 0.35% of the total number of entries. This means that missing data is of little importance for the study.

When it comes to skewness and kurtosis, the data is quite normal, with a range from -1.118 to zero for skewness and -0.985 to 1.049 for kurtosis. Only one question was above or below ± 1 for both skewness and kurtosis in the data. Therefore, no data transformation was done to correct this.

The means in themselves are also quite high, ranging from 3,31 to 4,36 on question level, and from 3.62 to 4.05 on factor level. Especially for learning behaviour and implementation, the means are high (4.05 and 4.03 respectively on factor level). One reason for this could be that they on average perceive themselves as better team workers than they really are. But another, and equally plausible explanation is that that the sample consist of very competent achievers, and that they actually are quite experienced in working in teams, and that the ratings therefore gives an adequate representation of their behaviour.

In table 2 below, you can see the minimum and maximum values for all questions, as well as the means and standard deviations.

	Minimum	Maximum	Mean	Std. Deviation
Learning behaviour				
We express the reasoning behind our viewpoints	3	5	4,00	,712
We seek the reasoning behind other team members viewpoints	2	5	3,82	,828
We have a climate for expressing alternative viewpoints and challenging each other	2	5	4,18	,793
We take the time to listen to each other	2	5	3,93	,762
Each of us has the opportunity to speak their mind	2	5	4,36	,756
We have good discussions	2	5	4,03	,632
Implementation				
We understand our strategy	2	5	4,07	,845
We are committed to our strategy	2	5	4,10	,858
We implement our strategic decisions	2	5	3,92	,770
Quality				
We have room for experimentation in our strategy process	1	5	3,31	,833
We are able to utilize ideas emerging throughout the simulation	1	5	3,63	,879
We are able to learn from our mistakes and successes	2	5	3,92	,707

Table 2: Minimum values, maximum values, means and standard deviation on question level

In table 3 below, you can see the minimum and maximum values on the factor level questions, as well as the means and standard deviations

	Minimum	Maximum	Mean	Std. Deviation	Cronbachs alfa
Learning behaviour	2,83	5,00	4,05	0,503	,756
Implementation factors	2,33	5,00	4,03	0,729	,861
Quality factors	1,67	5,00	3,62	0,647	,716

Table 3: Minimum values, maximum values, means, standard deviation and Cronbachs alpha on factor level

All three factors show acceptable levels of Cronbachs alpha. This underpins consistency of the three factors.

3.7 Data analysis method: Structural equation modelling

The purpose of this study was to investigate the relationships between learning behaviour, strategy quality and implementation, and performance. To highlight sample characteristics, descriptive statistics was used. This was conducted with SPSS. The relationships between the variables were estimated using Structural Equation Modelling with Mplus.

Structural Equation Modelling

Structural Equation Modelling (SEM) describes the relationships between observed variables, for the purpose of providing a quantitative test of a hypothetical theoretical model developed by the researcher. The basic goal is to determine the extent to which the theoretical model is supported by the sample data (Schumacker and Lomax 2004: 2).

In Structured Equation Modelling, there might be many possible models that fit the data at hand. However, the hypothesised models that are tested should be grounded in theory. The purpose is not to find the model that fits data best, but to test the theoretical model too see if they fit the data.

Simplified, SEM can be viewed as a more advanced variant of path analyses, which makes it possible to estimate how the path coefficient would have been if the data was without measurement error (Lund et al. 2002: 283-284).

A combined confirmatory factor analysis (CFA) and regression analysis was run in Mplus software for structural equation modelling (SEM). One benefit from running the CFA in SEM software is the option of testing the fit of a hypnotized model including a) the relation between the observed factors and the latent factors, and b) the relationship between the latent factors. The Mplus builds on SEM techniques to examine the accuracy of the correlation between a hypothesized model of self-assessment and an empirical model (Brown 2006).

A hypothesised model is specified using relevant theory and research, and then tested to see if the model fit the data. If the fit between the theoretical model and the data is not strong enough, the model can be modified, and then tested again. This is not unusual for initial models (Schumacker and Lomax 2004: 62-70).

To establish model fit, different criteria can be used, and it is recommended that various fit criteria are used in combination (Schumacker and Lomax 2004: 83). Hu and Bentler (Bentler and Hu 1995, in Hsu and Hsieh 2009: 2459), recommends cutoff criteria of fit indices as listed below:

- A non-significant chi-square
- The chi-square divided on the degrees of freedom: <3 or <5
- Root Mean Square Error of Approximation (RMSA) ≤ 0.06
- Comparative Fit Index (CFI) >0.90 or 0.95
- Standardised Root Mean square Residual (SRMR) ≤ 0.08

Hu and Bentler suggests the combination of two fit indices, and recommends using the Standardised Root Mean square Residual (SRMR) in combination with either the Root Mean Square Error of Approximation (RMSA), the Tucker-Lewis Index (TLI) or the Comparative Fit Index (CFI) (Lervåg 2005: 99). In this study, I will use a combination of RMSA, CFI and SRMR, together with chi-square, since chi-square is the only statistical test of significance for the testing the theoretical model(Schumacker and Lomax 2004: 82-83).

The sample size is $n = 72$, which is below what is recommended for structural equation models (Schumacker and Lomax 2004: 49)., but still, data was sufficient to determine the above listed fit indices, and to show significant relationships between variables.

For sample sizes $N < 250$, Hu and Bentler suggest a SRMR value < 0.09 in combination with a CFI value $\Rightarrow 0.95$ (Lervåg 2005: 99).

3.8 Validity and reliability

In this study, I will use four types of validity, which are construct validity, statistical conclusion validity, internal validity and external validity. The four types will in the following be described further.

3.8.1 Construct validity

Construct validity points to the question whether the variables measures what it sets out to measure. Threats to this could be:

- Hypothesis guessing, which happens if the respondents in the sample group tries to guess the purpose of the study, and that they act atypically because of this.
- Evaluation apprehension, which happens when apprehension about being evaluated results in respondents in the sample group trying to depict themselves as more competent than they are (Lund et al. 2002: 120-121).

Both threats could be in present in the study, but for hypothesis guessing, I see the risk as being low. This because of the limited time the respondents had available for filling out the questionnaire, and because there was not gain for them in trying to guess what the purpose was.

When it comes to evaluation apprehension, I see the chance of this threat being present. As we have already seen, the averages, especially for learning behaviour and implementation are high, with most of the respondents rating themselves in the higher end of the scale. I have already discussed different explanations for this, but I can not rule out the possibility of this at least partially coming from evaluation apprehension. On the other hand, if this threat is evenly distributed among the respondents, any correlations between the variables would still be valid.

3.8.2 Statistical conclusion validity

The question in statistical conclusion validity is whether the relationships between variables are statistically significant (Lund et al. 2002: 105). Statistical conclusion validity is a requirement for making inferences about causal relationships (Ghauri and Grønhaug 2005: 85). Both the problem statements in this study hypothesise causality between variables. This means that in order for the hypothesised models to be accepted, the correlations between the variables have to be statistically significant.

3.8.3 Internal validity

Internal validity refers to the extent to which we can infer that a causal relationship exists between two or more variables (Ghauri and Grønhaug 2005: 85). Lund et al. states that in disciplines that have as its goal to intervene and create changes, some notion of causality is needed in order to be able to give reasons for why things might or might not work, that is, give grounds for action (Lund et al. 2002: 56).

Pearson's correlation coefficient can not determine this kind of cause-and-effect relationships, and in SEM it is the amount of influence rather than a cause-and-effect that is assumed and interpreted. The necessary conditions for determining such causal relationships are:

1. Temporal order (X precedes Y in time)
2. Existence of covariance or correlation between X and Y
3. Control for other causes (Schumacker and Lomax 2004: 56).

In this survey, learning behaviour and strategy quality and implementation is measured at the same time, while performance is measured at a later time. This allows for the hypothesised effect from learning behaviour and strategy quality and implementation to performance to operate. This also means that the interpretation of causality between learning behaviour and strategy quality and implementation may be problematic. However, MacCallum and Austin

argue that it is not unusual that the time lag in which the causal effect operates is effectively instantaneous, thereby justifying the interpretation of a causal effect (MacCallum and Austin 2000: 214).

The threat of history and maturation to internal validity can not be ruled out, but the fact that all participants has fairly homogenous background, and that they are in the same environment throughout the simulation, should minimise this threat (Lund et al. 2002: 117).

3.8.4 External validity

The question of external validity is the question weather the findings from this study can be generalised to other situations (Lund et al. 2002: 121). External validity can be seen as a function of the general similarity between the survey and the goal that the generalization is aimed for (Lund et al. 2002: 125-126).

The target population for the study is organisations in general. A best case scenario would be that the findings from this study could be generalised to all organisations. Several things make such a generalisation difficult. First of all, the fact that all respondents come from the same company questions weather the findings can be generalised to other companies. Secondly, since I have a non-probability sample, it is unsure weather the sample is representative for the company, not to mention the target population (Lund et al. 2002: 122). Third, since the sample is geographically located in a specific area of Europe, it is a question if the sample is representative for organisations outside this area. And at last, since the data is gathered from a situation which is experimental by nature, and therefore different from “real life”, the generalisation of the findings to real life is questionable.

All these threats to external validity are real, and will be dealt with later in the paper when it is time to draw conclusions.

3.9 Reliability

Cronbachs Alpha reliability coefficient is traditionally reported as the measure of the intercorrelations between the indicators of the underlying construct (Schumacker and Lomax 2004: 179). As listed in table 3, Cronbachs Alpha for the three constructs learning behaviour, implementation and strategy range from 0.716 to 0.861, indicating acceptable reliability and internal consistency.

4 Findings

In this chapter I will present the findings from the statistical analyses.

4.1 The relationship between the items in the study

This part is about the relationships between the items in the study. The table below shows the correlations on item level.

	1	2	3	4	5	6	7	8	9	10	11	12	13
Learning behaviour													
1	1												
2	,502**	1											
3	,399**	,415**	1										
4	,235*	,452**	0,186	1									
5	0,000	,353**	,242*	,489**	1								
6	,351**	,364**	,358**	,339**	,454**	1							
Implementation													
7	,398**	,401**	,275*	0,210	0,225	,453**	1						
8	,415**	,263*	,388**	0,076	0,119	,497**	,690**	1					
9	,466**	,399**	,328**	0,111	0,127	,460**	,541**	,785**	1				
Quality													
10	0,166	0,183	-0,021	0,060	0,046	0,226	,350**	,332**	,449**	1			
11	,270*	,409**	0,078	0,222	,270*	,301*	,510**	,292*	,406**	,389**	1		
12	0,224	,407**	0,052	0,204	0,215	,358**	,481**	,315**	,332**	,426**	,583**	1	
Performance													
13	,322**	,244*	,290*	0,156	0,090	0,225	,295*	,265*	,285*	0,167	,326**	0,150	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4: Correlations on item level

The results indicate that most of the items measuring learning behaviour is significantly correlated (except between item 1 and item 5). Further the findings show that the items used to measure implementation is highly correlated and the items used to measure quality are highly correlated. However, in a path model with latent variables a factor analysis is conducted together with a regression analysis.

4.2 The relationship between the factors in the study

The table below shows the relationship between learning behaviour, implementation factors, quality factors and rating in the simulation.

		1	2	3	4
1	Learning behaviour	1,000			
2	Implementation factors	.516**	1,000		
3	Quality factors	.372**	.544**	1,000	
4	Rating in the simulation	.331**	.320**	.273*	1,000

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

Table 5: Correlations on factor level

The results show that rating in the simulation (performance), is significant positively related with the factors learning behaviour and strategy. Further, the results show a high correlation (Pearson's $r > 0.50$) between learning behaviour and implantation factors, and between quality factors and implantation factors. One problem with high correlations between factors is multicollinearity. This means that estimates becomes inaccurate, and makes it harder to show significant effects between variables (Christophersen 2006: 180).

4.3 Research question 1

Research question 1 focus on the impact from learning behaviour on performance. In order to examine research question 1, a structural equation model is analysed. The model consists of one latent independent variable – learning behaviour (created by six questions) – and one dependent observed variable, performance.

A SEM analysis was performed to observe to if the theoretical model yielded an adequate dimensional factor structure. There were 28 observations according to the formula $(7*8)/2$ for this specified model. The model adopted in this study has 8 estimated parameters. The theoretical model used in this study is presented in Figure 14.

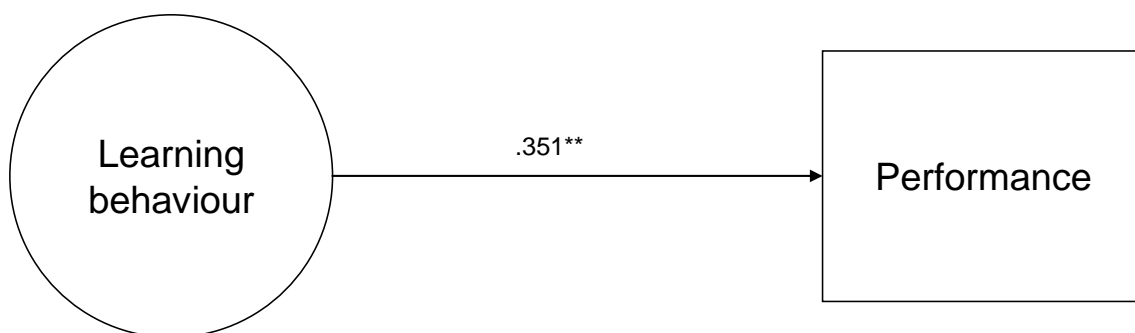


Figure 14: The relationship between the latent variable Learning behaviour and the observed variable performance from the business simulation. The results show: $\chi^2(14.678, n=72)=13$ and $p=0.328$ ($p>0.05$), with CFI = 0.984, RMSEA = 0.042 and SRMR = 0.059

After the first run of the model, because there are correlating residuals, the programme suggests model modification indices. The suggestion is to correlate “We express the reasoning behind our view points” with “Each of us has the opportunity to speak our mind”.

After this, the model converges to an acceptable solution. The standardized factors loadings, used to develop learning behaviours, are all significant and the estimates are ranging from 0.527 to 0.690. Learning behaviour explains 12% of the variance in performance ($R^2 =$

0.123). Overall, the model have an acceptable fit to the data because the results from the SEM-analysis show: $\chi^2(14.678, n=72)=13$ and $p=0.328$ ($p>0.05$) with CFI = 0.984 RMSEA = 0.042 and SRMR = 0.059. Overall the model is acceptable because of

- A non-significant chi square (χ^2) indicate no difference between the theoretical model and the empirical model ($p>0.05$)
- A good fit: Chi square/ degrees of freedom: $14.678/13= 1.13$ (<3 or <5)
- A high CFI: 0.984 (>0.90 or >0.95)
- A low RMSA: 0.042 (Good fit $< 0,06$, reasonable fit between 0.06-0.08)
- A low SRMR: 0.059: (≤ 0.08)

The survey confirms the relationship between learning behaviour and performance previously established by Iversen (Iversen 2006: 26) and Edmondson (Edmondson 1999: 9).

4.4 Research question 2

However, another purpose of this study is to find the relationship between learning behaviour, implementation of strategy, quality of strategy and performance. Research question 2 focuses on the influence on performance from learning behaviour, mediated by strategy quality and implementation. As research question 1, research question 2 is analysed through a structural equation model. The model consists of one latent independent variable – learning behaviour (created by six questions), two mediation variables – quality and implementation (both created by three questions) – and one depended observed variable, performance.

Again, a SEM analysis was performed to observe if the theoretical model yielded an adequate dimensional factor structure. Thus, there were 91 observations for this specified model. The model adopted in this study has 16 estimated parameters. The theoretical model used in this study is presented in figure 15.

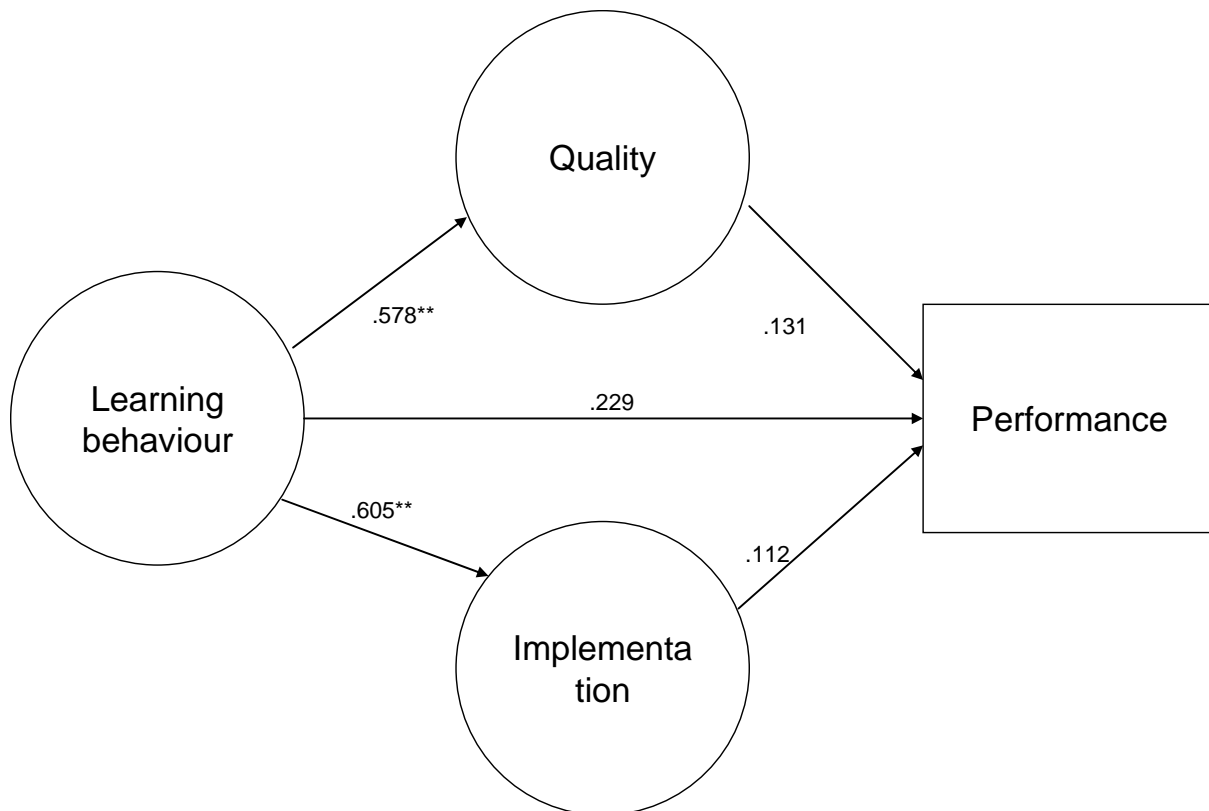


Figure 15: The relationship between the latent variable Learning behaviour, the two mediation variables quality and implementation and the observed variable performance from the business simulation. The results show: $\chi^2(96.514, n=72)=60$ and $p=0.002$ ($p<0.05$) with CFI = 0.889, RMSEA = 0.092 and SRMR = 0.096

After the first run of the model, the programme suggests model modification indices. The suggestion is to correlate “We express the reasoning behind our view points” with “Each of us has the opportunity to speak our mind”.

Still, after modifying them model as suggested, the model fit indices indicates poor fit to the data, with the results from the SEM-analysis showing: $\chi^2(96.514, n=72)=60$ and $p=0.002$ ($p<0.05$), with CFI = 0.889, RMSEA = 0.092 and SRMR 0.096. Even if chi square/degrees of freedom indicates good fit: ($96.514/60= 1.61$), the model is not acceptable because of

- A significant chi square (χ^2) indicate difference between the theoretical model and the empirical model
- A low CFI: 0.889 (>0.90 or >0.95)
- A high RMSA: 0.092 (Good fit $< 0,06$, reasonable fit between 0.06-0.08)
- A high SRMR: 0.096: (≤ 0.08)

So as stated, model fit indices indicates poor fit, but the high and significant correlations between learning behaviour and quality/ implementation shows a relationship between these factors. However, the correlations to performance are all weaker, and non-significant, indicating that this model does not explain the impact on performance from learning behaviour, strategy quality and strategy implementation.

4.4.1 Exploring alternative models

Since hypothesised model 2 did not fit the data, I will explore the possibilities for a new model that will fit the data, and still be theoretically well-founded. According to Schumacker and Lomax, model modification to achieve better model fit to data is not unusual (Schumacker and Lomax 2004: 224).

First, I set out to explore the different parts of the model.

Quality, implementation and performance

Since we have already established the relationship between learning behaviour and performance, but the hypotheses full model does not work, I test the model without learning behaviour.

There were 28 observations for this specified model. The model adopted in this study has 9 estimated parameters. The theoretical model used in this study is presented in figure 16.

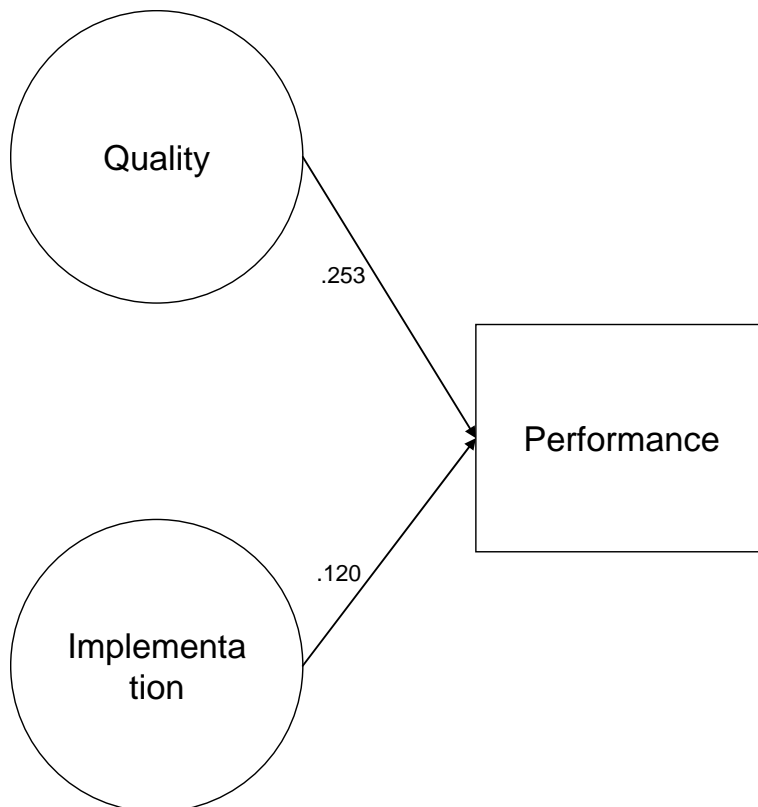


Figure 16: The relationships between the latent variables quality and implementation and the observed variable performance from the business simulation. The results show: $\chi^2(33.233, n=72)=12$ and $p=0.001$, with CFI = 0.892, RMSEA = 0.157 and SRMR = 0.068

After the first run of the model, the programme suggests model modification indices. The suggestion is to correlate “We implement our strategic decisions” with “We understand our strategy” and “We implement our strategic decisions” with “We are committed to our strategy”.

After making the suggested modifications, the model comes back with acceptable fit, but with the warning that the residual covariance matrix is not positive definite. When checking the data output from Mplus, I found that one of the factor loadings was above 1. I therefore went back to the original model, without modifications.

After this, the model has poor fit because the results from the SEM-analysis show: $\chi^2(33.233, n=72)=12$ and $p=0.001$, with CFI = 0.892, RMSEA = 0.157 and SRMR = 0.068. Despite chi square/degrees of freedom ($33.233/12= 2.77$) and a low SRMR (0.068) (indicating good fit, the model is not acceptable because of

- A significant chi square (χ^2) indicate difference between the theoretical model and the empirical model
- A low CFI: 0.892 (>0.90 or >0.95)
- A high RMSA: 0.157 (Good fit < 0.06 , reasonable fit between 0.06-0,08)

The model fit indices indicates poor fit, meaning that the model does not make sense without leaning behaviour.

Learning behaviour, implementation and performance

There were 55 observations for this specified model. The model adopted in this study has 12 estimated parameters. The theoretical model used in this study is presented in figure 17.

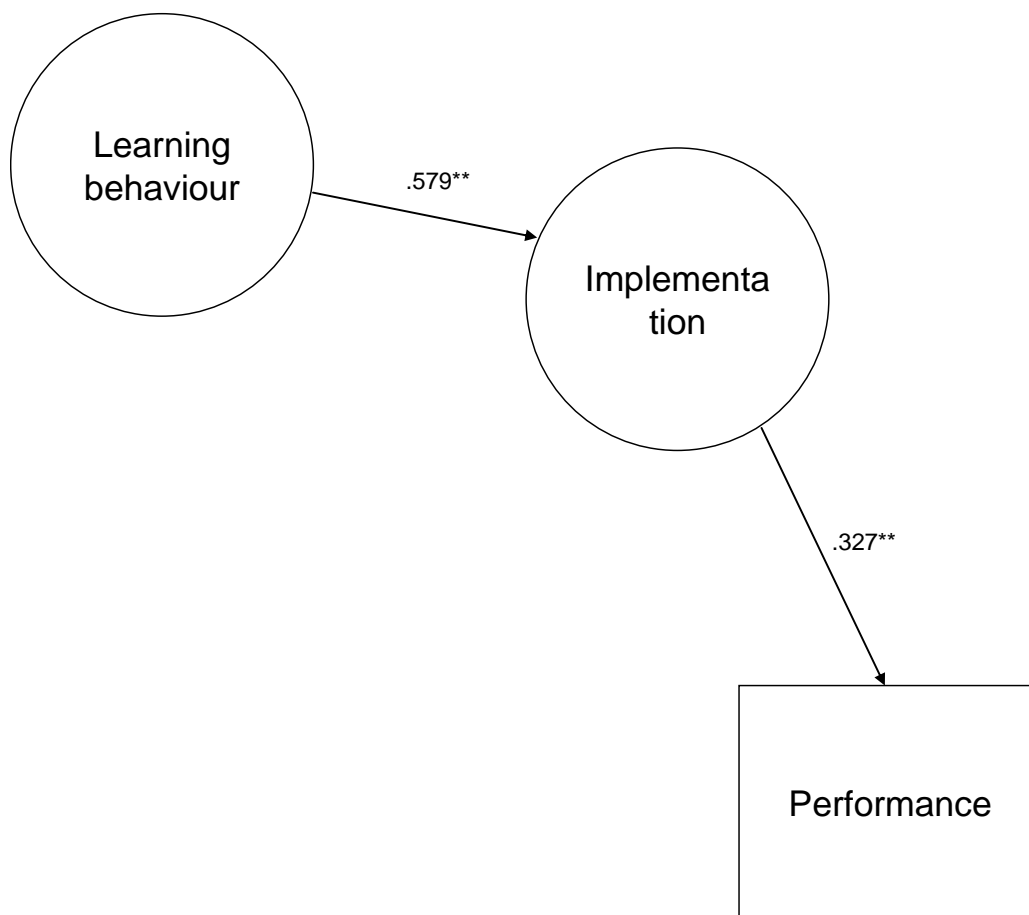


Figure 17: The relationships between the latent variables learning behaviour and implementation, and the observed variable performance from the business simulation. The results show: $\chi^2(54.399, n=72)=33$ and $p=0.011$, with CFI = 0.915, RMSEA = 0.095 and SRMR = 0.087

After the first run of the model, the programme suggests model modification indices. The suggestion is to correlate “We express the reasoning behind our viewpoints” with “Each of us has the opportunity to speak their mind”.

However, after this modification, model fit indices still indicates poor fit to the data, because the results from the SEM-analysis show: $\chi^2(54.399, n=72)= 33$ and $p=0.011$, with CFI = 0.915, RMSEA = 0.095 and SRMR = 0.087. Even if chi square/degrees of freedom indicate good fit: $(54.399/33= 1.65)$, and CFI is medium high (0.915 (>0.90 or >0.95)), the model is not acceptable because of

- A significant chi square (χ^2) indicate difference between the theoretical model and the empirical model
- A medium high CFI: 0.915 (>0.90 or >0.95)
- A high RMSA: 0.095 (Good fit $< 0,06$, reasonable fit 0.06-0.08)
- A high SRMR: 0.087 (≤ 0.08)

Model fit indices indicates poor fit, but the high and significant correlations between learning behaviour and quality/ implementation suggests a relationship between these factors

Learning behaviour, quality and performance

There were 55 observations for this specified model. The model adopted in this study has 12 estimated parameters. The theoretical model used in this study is presented in Figure 18.

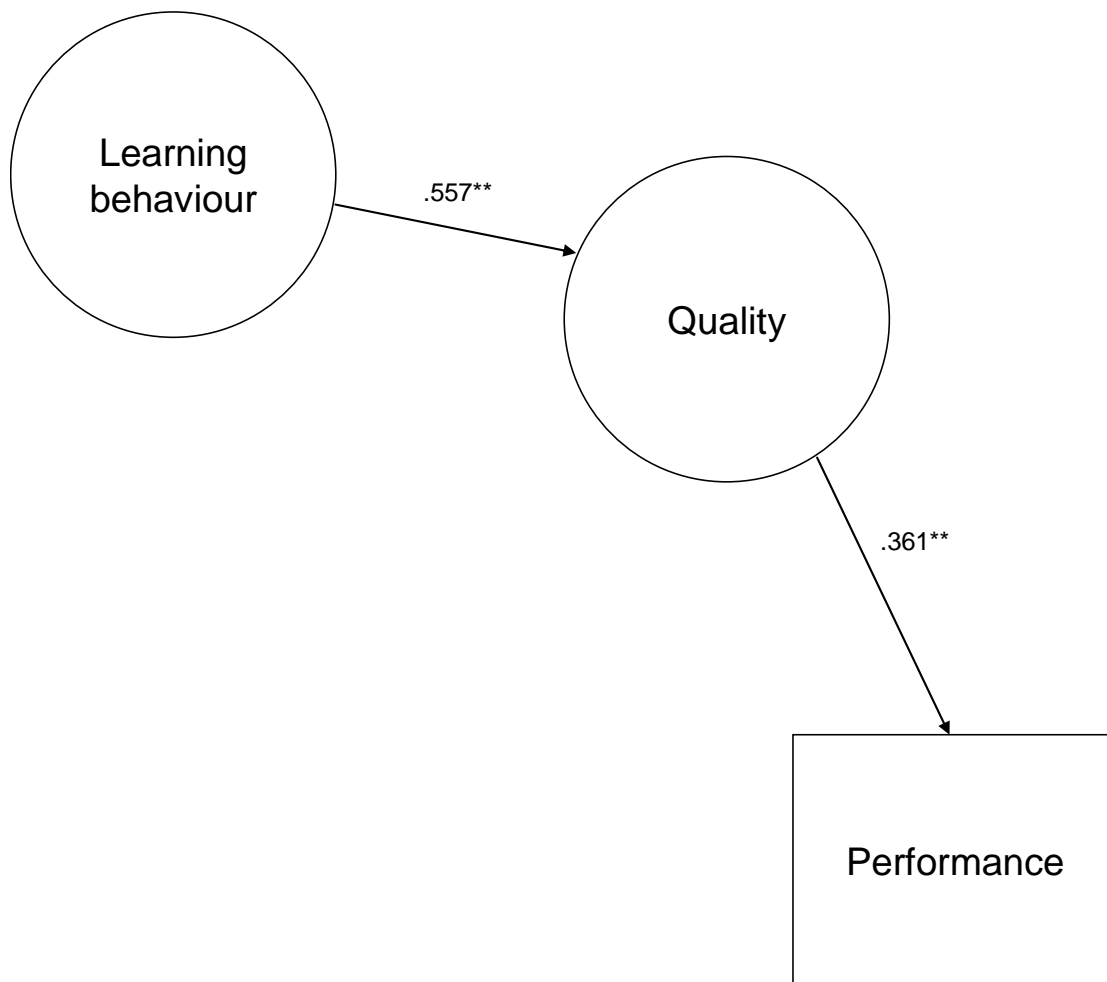


Figure 18: The relationship between the latent variable Learning behaviour and the observed variable performance from the business simulation. The results show: $\chi^2(37.045, n=72)=33$ and $p = 0.00$, with CFI = 0.975, RMSEA = 0.041 and SMR = 0.072

After the first run of the model, the programme suggests model modification indices. The suggestion is to correlate “Each of us has the opportunity to speak their mind” with “We express the reasoning behind our viewpoints”.

After this modification, the model have an acceptable fit to the data because the results from the SEM-analysis show: $\chi^2(37.045, n=72)=33$ and $p=0.00$), with CFI = 0.975, RMSEA = 0.041 and SRMR = 0.072. The model is acceptable because of

- A non-significant chi square (χ^2) indicate no difference between the theoretical model and the empirical model
- A good fit: Chi square/ degrees of freedom: $37.045/33= 1.12$ (<3 or <5)
- A high CFI: 0.975 (>0.90 or >0.95)
- A low RMSA: 0.041 (Good fit $< 0,06$, reasonable fit between 0,06-0,08)
- A low SRMR: 0.072 (≤ 0.08)

The standardized factors loadings used to develop learning behaviour and quality are significant for both variables, and the estimates are ranging from

- Learning behaviour 0.395 to 0.584
- Quality 0.414 to 0.707

Learning behaviour explains 31% ($R^2 = 0.31$) of the variance in quality, and quality explains 13% ($R^2 = 0.13$) of the variance in performance.

4.4.2 Using Cholesky factoring to examine multicollinearity

As we have seen earlier in the chapter, all the variables in the study are significantly correlated. For the independent variables, the correlations are:

- Learning behaviour and implementation: 0.516
- Learning behaviour and quality: 0.372
- Quality and implementation: 0.544

One problem that can occur with high correlations between variables is multicollinearity, which is a phenomenon in which two or more predictor variables in a model are highly

correlated This means that estimates becomes inaccurate, and makes it harder to show significant effects between variables (Christophersen 2006: 180).

Because of the indications of multicollinearity between some of the variables, I used Cholesky factoring to assess the unique predictive relationships between the three variables learning behaviour, quality and implementation. Cholesky factoring is equivalent to hierarchical regression analyses with latent variables (Lervåg, Bråten og Hulme 2009: 772).

Cholesky factoring was used for four models, which will be presented in following.

Cholesky factoring for learning behaviour and quality

In figure 19, I will assess the unique predictive relationships between learning behaviour and performance (PH2), and the combination of learning behaviour and quality to performance (PH1).

There were 55 observations for this specified model. The model adopted in this study has 14 estimated parameters. The model used in this study is presented in Figure 19.

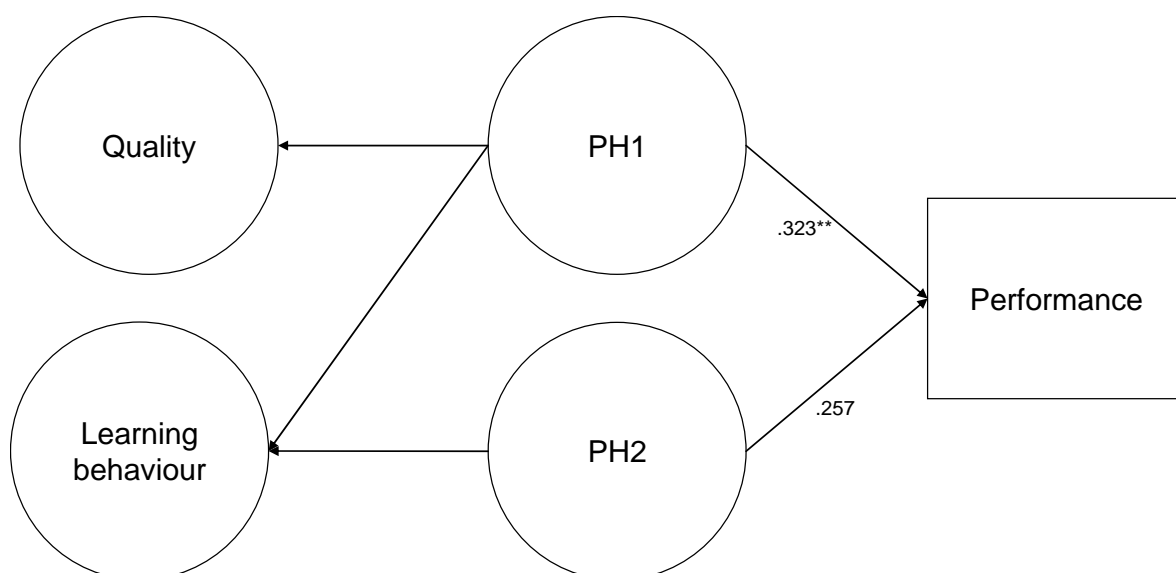


Figure 19: Cholesky factoring for learning behaviour and quality, run 1. The results show: $\chi^2(109.386, n=72)=61$ and $p=0.000$, with CFI = 0.853, RMSEA = 0.105 and SRMR = 0.085

Overall, model fit indices indicates poor fit to the data, because the results from the SEM-analysis show: $\chi^2(109.386, n=72)= 61$ and $p=0.000$, with $CFI = 0.853$, $RMSEA = 0.105$ and $SRMR = 0.085$. Even if chi square/degrees of freedom indicate good fit: $(109.386/61= 1.79)$, the model is not acceptable because of

- A significant chi square (χ^2) indicate difference between the theoretical model and the empirical model
- A low CFI: 0.853 (>0.90 or >0.95)
- A high RMSA: 0.105 (Good fit $< 0,06$, reasonable fit 0.06-0.08)
- A high SRMR: 0.085 (≤ 0.08)

In the next model I will assess the unique predictive relationships between quality and performance (PH2), and the combination of learning behaviour and quality to performance (PH1).

There were 55 observations for this specified model. The model adopted in this study has 14 estimated parameters. The theoretical model used in this study is presented in figure 20.

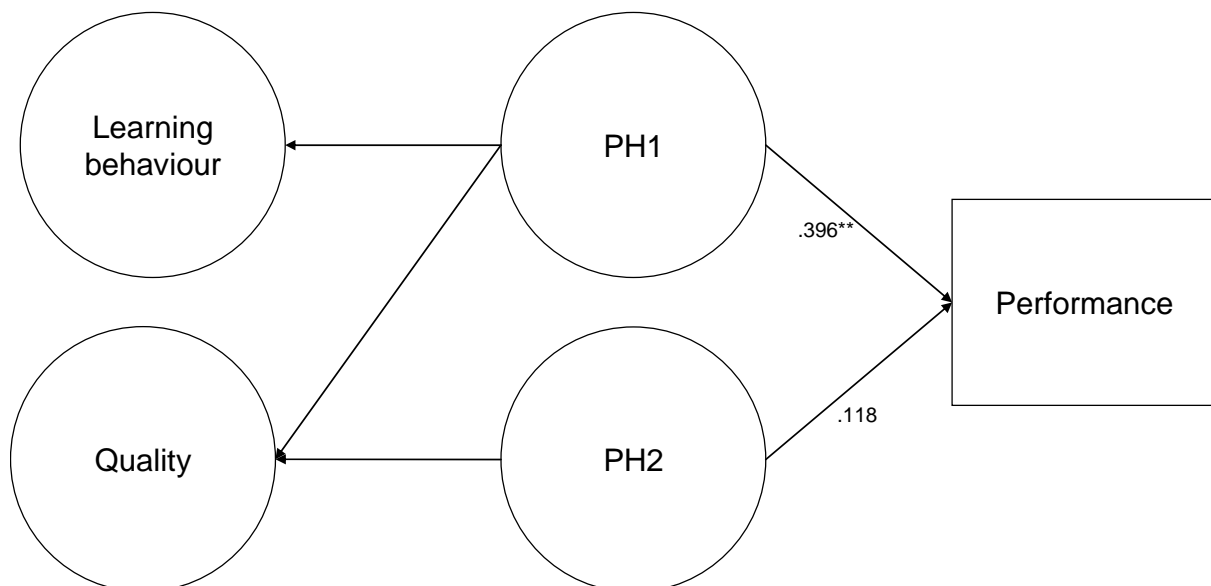


Figure 20: Cholesky factoring for learning behaviour and quality, run 2. The results show: $\chi^2(10.386, n=72)=61$ and $p=0.000$, with $CFI = 0.853$, $RMSEA = 0.105$ and $SRMR = 0.085$

Overall, model fit indices indicates poor fit to the data, because the results from the SEM-analysis show: $\chi^2(54.399, n=72)= 33$ and $p=0.011$, with $CFI = 0.915$, $RMSEA = 0.095$ and $SRMR = 0.087$. Even if chi square/degrees of freedom indicate good fit: $(54.399/33= 1.65)$, and CFI is medium high ($0.915 (>0.90$ or $>0.95)$), the model is not acceptable because of

- A significant chi square (χ^2) indicate difference between the theoretical model and the empirical model
- A medium high CFI: $0.915 (>0.90$ or $>0.95)$
- A high RMSA: 0.095 (Good fit $< 0,06$, reasonable fit $0.06-0.08$)
- A high SRMR: $0.087 (\leq 0.08)$

Cholesky factoring for learning behaviour and implementation

In figure 21, I will assess the unique predictive relationships between learning behaviour and performance (PH2), and the combination of learning behaviour and implementation to performance (PH1).

There were 55 observations for this specified model. The model adopted in this study has 14 estimated parameters. The theoretical model used in this study is presented in figure 21.

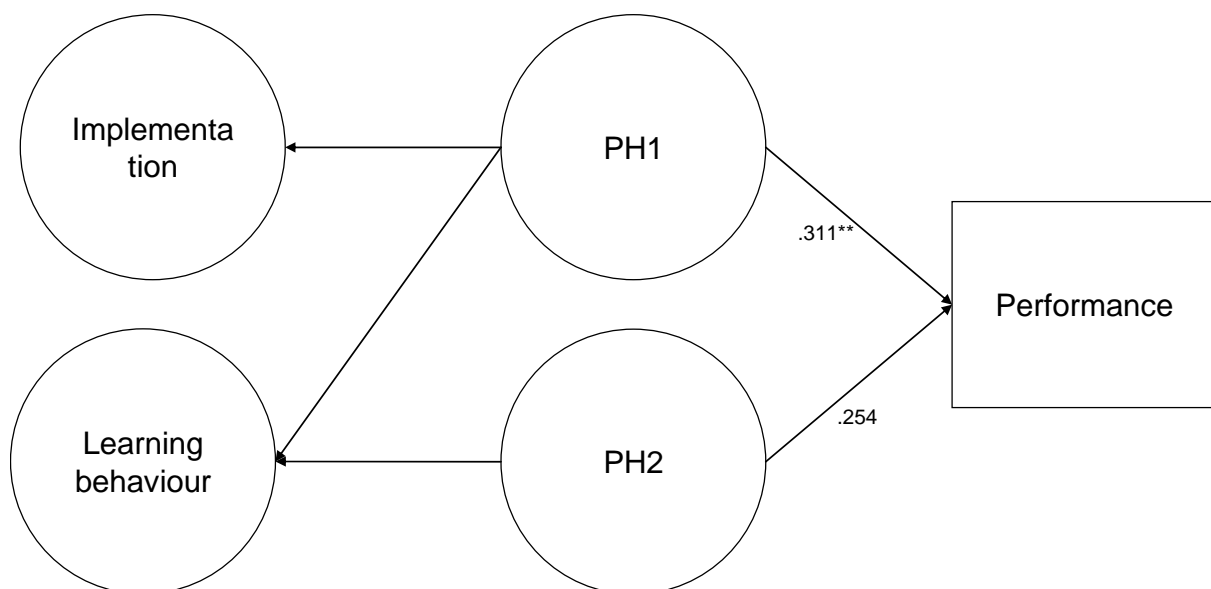


Figure 21: Cholesky factoring for learning behaviour and implementation, run 1. The results show: $\chi^2(69.082, n=72)=33$ and $p=0.000$, with $CFI = 0.856$, $RMSEA = 0.123$ and $SRMR = 0.085$

Overall, model fit indices indicates poor fit to the data, because the results from the SEM-analysis show: $\chi^2(69.082, n=72)= 33$ and $p=0.000$, with $CFI = 0.856$, $RMSEA = 0.123$ and $SRMR = 0.085$. Even if chi square/degrees of freedom indicate good fit: $(69.082/33= 2.09)$, the model is not acceptable because of

- A significant chi square (χ^2) indicate difference between the theoretical model and the empirical model
- A low CFI: 0.856 (>0.90 or >0.95)
- A high RMSA: 0.123 (Good fit $< 0,06$, reasonable fit 0.06-0.08)
- A high SRMR: 0.085 (≤ 0.08)

In the next figure (figure 22), I will assess the unique predictive relationships between implementation and performance (PH2), and the combination of learning behaviour and implementation to performance (PH1).

There were 55 observations for this specified model. The model adopted in this study has 14 estimated parameters. The theoretical model used in this study is presented in figure 22.

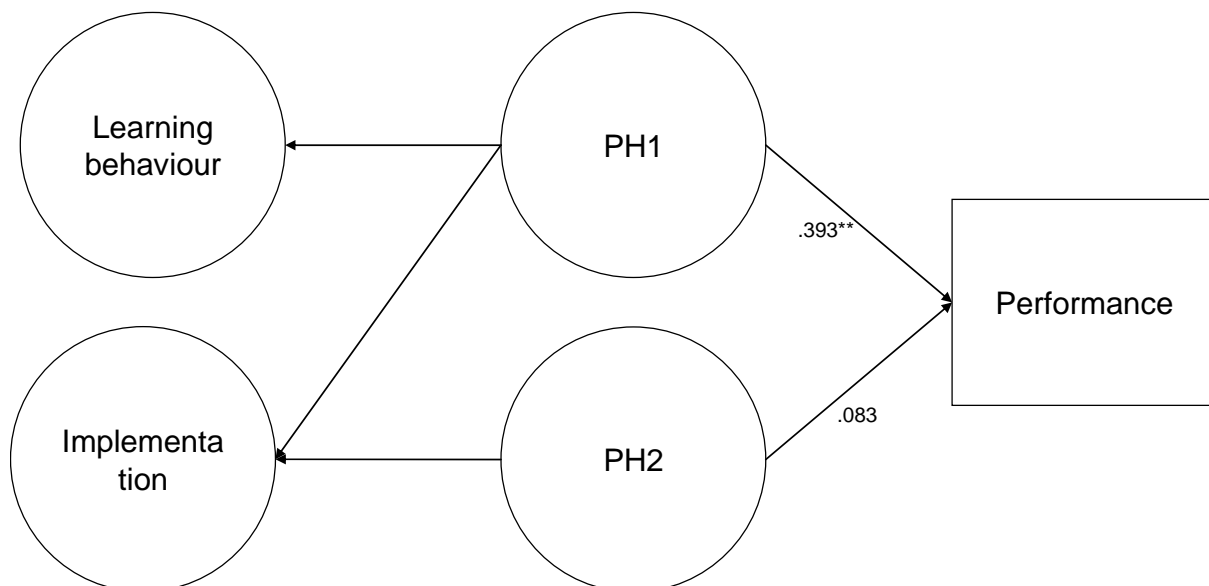


Figure 22: Cholesky factoring for learning behaviour and implementation, run 1. The results show: $\chi^2(69.082, n=72)=33$ and $p=0.000$, with $CFI = 0.856$, $RMSEA = 0.123$ and $SRMR = 0.085$

Overall, model fit indices indicates poor fit to the data, because the results from the SEM-analysis show: $\chi^2(69.082, n=72)= 33$ and $p=0.000$, with CFI = 0.856, RMSEA = 0.123 and SRMR = 0.085. Even if chi square/degrees of freedom indicate good fit: $(69.082/33= 2.09)$, the model is not acceptable because of

- A significant chi square (χ^2) indicate difference between the theoretical model and the empirical model
- A low CFI: 0.856 (>0.90 or >0.95)
- A high RMSA: 0.123 (Good fit $< 0,06$, reasonable fit 0.06-0.08)
- A high SRMR: 0.085 (≤ 0.08)

We see that all the Cholesky factoring models have poor fit, which mean that we can not use them to explain the relationships in the study.

4.4.3 Examining a second-order latent variable of strategy

What we have seen is that there is a relationship between learning behaviour and performance, but that the hypothesised model for the relationships between learning behaviour, quality, implementation and performance did not fit the data. The model with learning behaviour, quality and performance had good fit, and could explain 13% ($R^2 = 0.13$) of the variance in performance. Since this model fits the data, and can explain variance, I could have stopped here. But, I decided to continue the exploration, to see if I could specify a model that in would resemble the hypothesised model, fit the data, and explain more of the variance in performance.

As written before, a challenge is the issue of multicollineariy. I ran four Cholesky factoring models, none of which had acceptable model fit. Since Cholesky factoring did not yield satisfactory model fit, I will try a new approach, and combine variables and make a second-order factor.

Second order model 1

In the original hypothesised model, implementation and quality was separated, working on their own towards performance. Now I establish a second order, mediation variable called strategy, consisting of the first order variables quality and implementation. This second order variable is an expression for an interaction between the variables implementation and quality.

With learning behaviour still being the underlying driver, the new hypothesised model would be as shown in figure 23.

There were 91 observations for this specified model. The model adopted in this study has 17 estimated parameters.

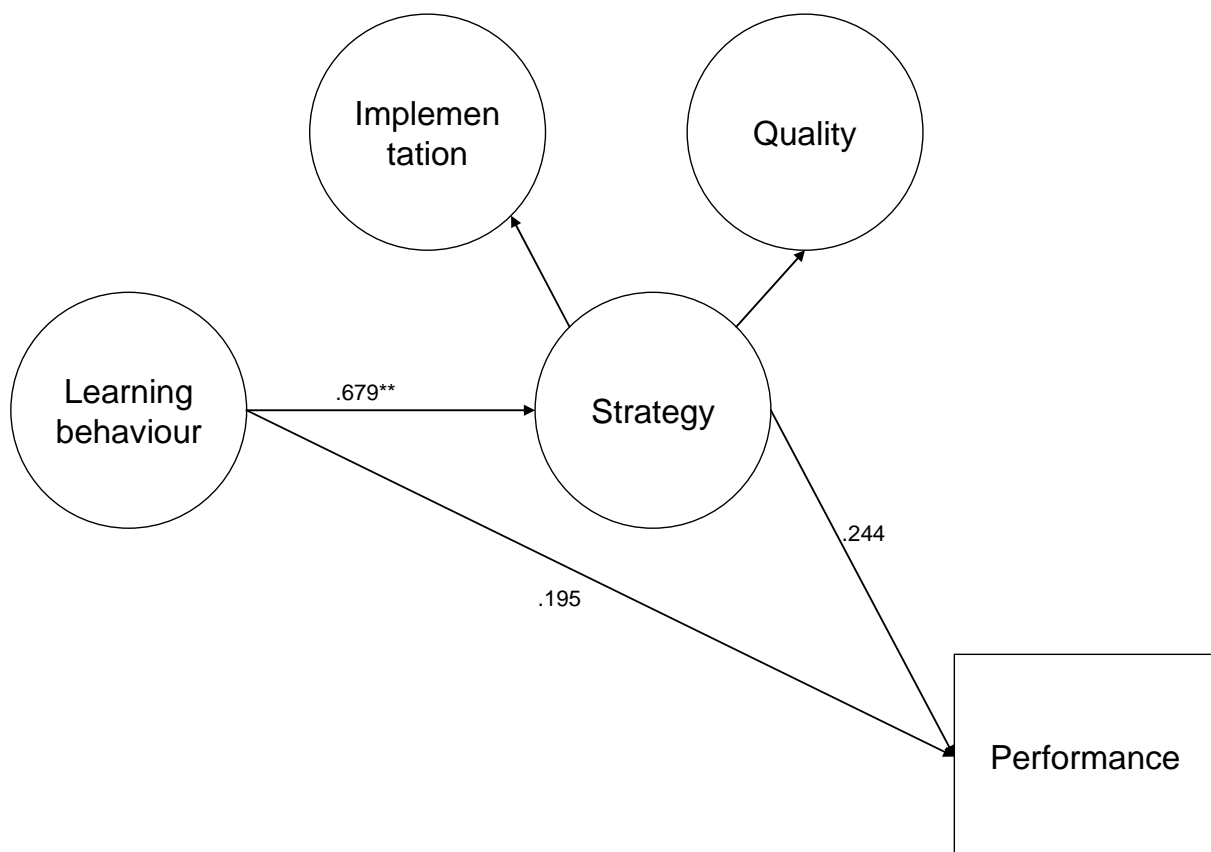


Figure 23: Second order model 1: The relationship between the latent variable learning behaviour, the second order variable strategy, and the observed variable performance from the business simulation. The results show: $\chi^2(69.644, n=72)=59$ and $p=0.162$, with CFI = 0.968, RMSEA = 0.050 and SRMR = 0.077

After the first run of the model, the programme suggests model modification indices. The suggestion is to correlate “Each of us has the opportunity to speak their mind” with “We express the reasoning behind our viewpoints” and “We implement our strategic decisions” with “We understand our strategy”.

After modifying the model, model fit indices indicates good fit to the data, because the results from the SEM-analysis show: $\chi^2(69.644, n=72)= 59$ and $p=0.162$, with CFI = 0.968, RMSEA = 0.050 and SRMR = 0.077. The model is acceptable because of

- A non-significant chi square (χ^2) indicate no difference between the theoretical model and the empirical model
- A good fit: Chi square/ degrees of freedom: $69.644/59= 1.18$ (<3 or <5)
- A high CFI: 0.968 (>0.90 or >0.95)
- A low RMSA: 0.050 (Good fit $< 0,06$, reasonable fit 0.06-0.08)
- A low SRMR: 0.077 (≤ 0.08)

The standardized factors loadings used to develop the variables are significant, and the estimates are ranging from

- Learning behaviour 0.523 to 0.720
- Quality 0.57 to 0.789
- Implementation 0.767 to 0.9888
- Strategy 0.783 to 0.807

However, the only significant relationship in the model is between learning behaviour and strategy, where learning behaviour explains 46% ($R^2 = 0.46$) of the variance in strategy. So even if the model fits the data, it does not explain the variance in performance.

As previously, this could be caused by multicollinearity, which could be why the model does not show significant effects between variables.

Second order model 2

One possible modification of the model would be to assume that learning behaviour works only indirectly through strategy on performance. This means that I will test the same model, but without the direct relationship between learning behaviour and performance.

There were 91 observations for this specified model. The model adopted in this study has 17 estimated parameters. The theoretical model used in this study is presented in figure 24.

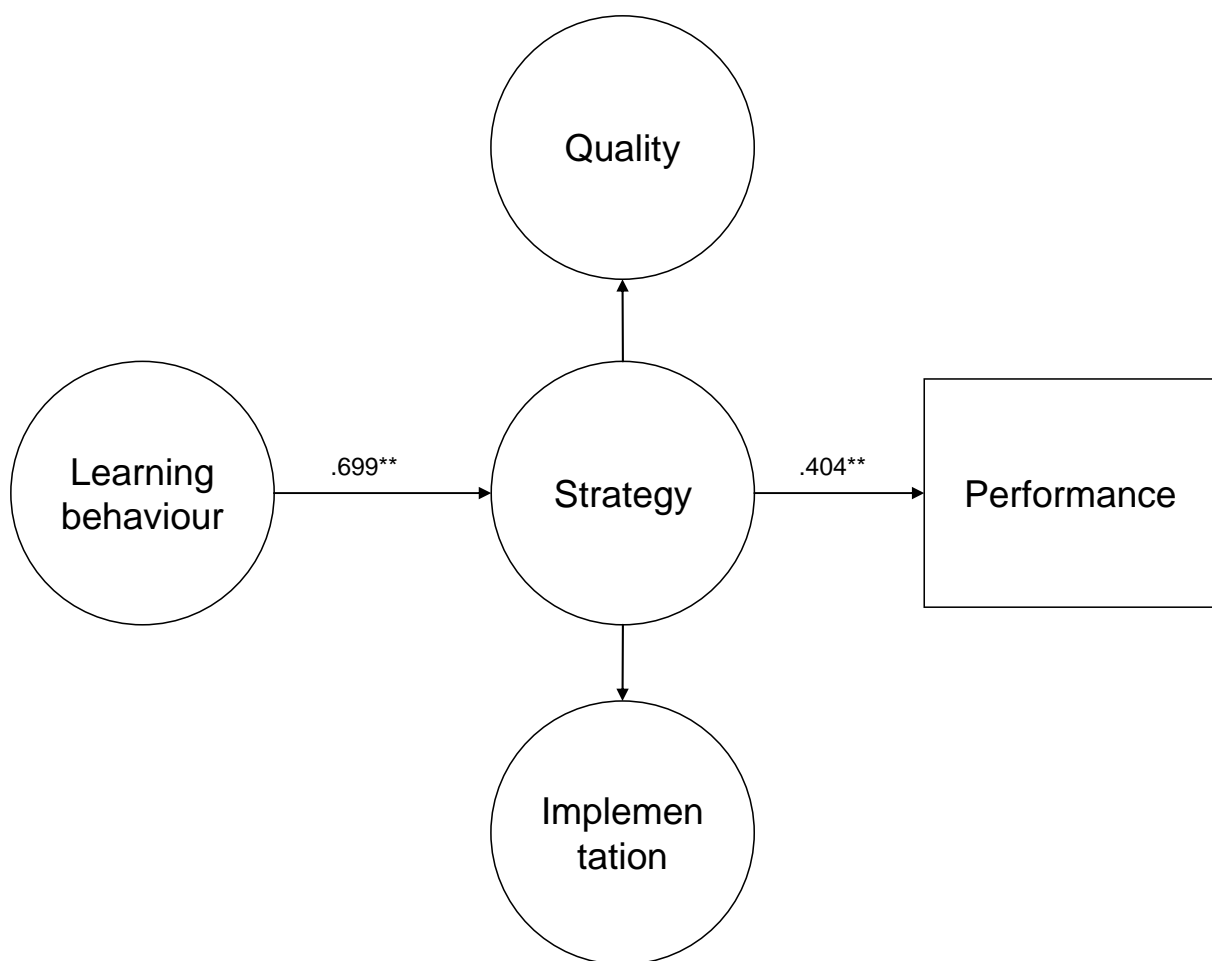


Figure 24: Second order model 2: The relationship between the latent variable learning behaviour, the second order variable strategy, and the observed variable performance from the business simulation. The results show: $\chi^2(70.645, n=72)=60$ and $p=0.164$, with CFI = 0.968, RMSEA = 0.050 and SRMR = 0.078

After the first run of the model, the programme suggests model modification indices. The suggestion is to correlate “Each of us has the opportunity to speak their mind” with “We express the reasoning behind our viewpoints” and “We implement our strategic decisions” with “We understand our strategy”.

After their modification, the model has an acceptable fit to the data because the results from the SEM-analysis show: $\chi^2(70.645, n=72)=60$ and $p=0.164$, with $CFI = 0.968$, $RMSEA = 0.050$ and $SRMR = 0.078$. The model is acceptable because of

- A non-significant chi square (χ^2) indicates no difference between the theoretical model and the empirical model
- A good fit: Chi square/ degrees of freedom: $70.645/60= 1.18$ (<3 or <5)
- A high CFI: 0.968 (>0.90 or >0.95)
- A low RMSEA: 0.050 (Good fit $< 0,06$, reasonable fit between $0,06-0,08$)
- A low SRMR: 0.078 (≤ 0.08)

The standardized factors loadings used to develop the variables learning behaviour, quality, implementation and the second order variable strategy are all significant and the estimates are ranging from

- Learning behaviour 0.517 to 0.722
- Quality 0.551 to 0.793
- Implementation 0.770 to 0.985
- Strategy 0.768 to 0.815

Learning behaviour explains 49% ($R^2 = 0.49$) of the variance in strategy, and strategy explains 16% ($R^2 = 0.16$) of the variance in performance.

When checking for the indirect effect from learning behaviour to performance, model fit indices were the same as for the model shown above, indicating good fit. The indirect effect from learning behaviour to performance is significant ($p=0.003$), and estimated to 0.28 .

This second order model is similar enough to the hypothesised model, fits the data, and explains more of the variance in performance than any of the previous models. In structural equation

modelling, there might be several model that fit data¹, but it is important that the model is grounded in theory. Since this model is close to the original hypothesised model and seems to fit with the theory, I will stop the model exploration here.

Below you can find a table with the factor loadings for this final model. The variable NY in the table is the second order variable strategy.

		Esti mate	S.E.	Est./S. E.	P- Value
QUAL BY					
	EXPER	0.551	0.100	5.534	0.000
	UTID	0.793	0.071	11.228	0.000
	LEARF	0.718	0.078	9.230	0.000
LB BY					
	EXP	0.652	0.087	7.473	0.000
	SEEK	0.722	0.072	10.067	0.000
	ALTV	0.517	0.097	5.332	0.000
	LIS	0.541	0.096	5.666	0.000
	SPEAK	0.567	0.102	5.580	0.000
	DISC	0.644	0.082	7.848	0.000
IMPL BY					
	UNDST	0.934	0.068	13.688	0.000
	COMSTR	0.770	0.063	12.275	0.000
	IMPLSTR	0.985	0.061	16.108	0.000
NY BY					
	QUAL	0.815	0.088	9.261	0.000
	IMPL	0.768	0.097	7.939	0.000

Table 6: Factor analyses for second order model 2. The variable NY is the second order variable strategy from the structural equation model.

¹ For example, when running a reverse model, in the order Strategy – Learning behaviour – Performance, the model fit was $\chi^2(71.293, n=72)=60$ and $p=0.151$, with CFI = 0.96, RMSEA = 0.051 and SRMR = 0.078, and explained variance on performance was 15% ($R^2 = 0.15$)

5 Discussion

In the following chapter, the findings from the study will be discussed in light of the research questions, and theory from chapter 2 and 3. In addition, practical implications will be discussed.

5.1 Research question 1

My first research question is: Does increased use of learning behaviour in a business simulation have an impact on the overall performance in the business simulation?

The findings show two things. First, the structured equation model fits the data well, and second, learning behaviour explains 12% of the variance in performance.

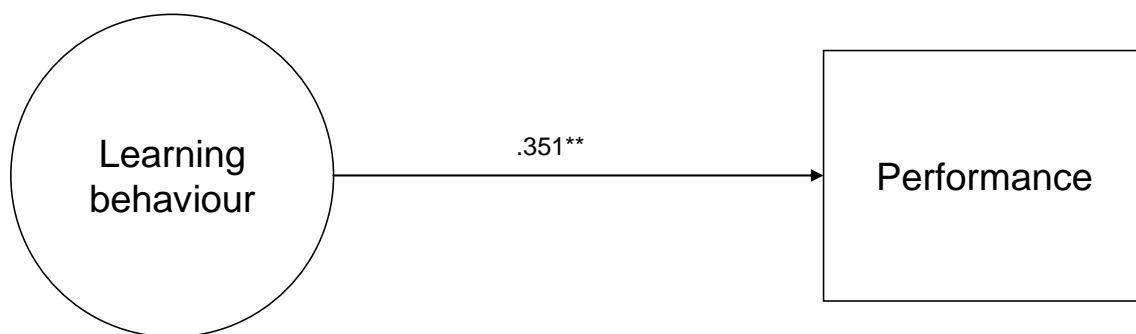


Figure 25: The relationship between the latent variable Learning behaviour and the observed variable performance from the business simulation. The results show: $\chi^2(14.678, n=72)=13$ and $p=0.328$ ($p>0.05$), with CFI = 0.84, RMSEA = 0.042 and SRMR = 0.059

This means that there is a positive relationship between learning behaviour and performance, as measured in this study. This finding is in line with previous research by Edmundson (1999), McArthur (McArthur 1994, in Iversen 2006) and Iversen (2006).

The findings are also by Hjertø, who states that research has found that skills corresponding to what we call learning behaviour, have a positive relationship to team performance (Hjertø 2008: 114-115).

When it comes to causality, all three of Schumacker and Lomax' (2004) conditions for causal relationships are fulfilled, indicating that there is a causal relationship from learning behaviour to performance.

Contradicting this, Iversen (2006) found that it is actually performance that predicts learning behaviour. Because of the research design in this study, I can not confirm or disconfirm her findings, but I have discussed this from a theoretical point of view earlier in the paper. What I argue, is that in the simulation, when the participants start their work together, they have no previous experience or performance from which learning behaviour can be influenced. This means that the initial predictor in the cycle of learning behaviour and performance has to be learning behaviour. This was supported by Hackman, who found that what happens the first time a group meets has a strong effect on how the group operates the rest of its life (Hackman 2009).

This means that while I do not reject Iversen's findings that performance predicts learning behaviour, my argument above and the fact that the conditions for casual relationships are fulfilled, I stick to my conclusion that the findings indicate that learning behaviour predicts performance.

In the study, learning behaviour is represented by questions like to which degree they have good conversation, express the reasoning behind their viewpoints and ask for the reasoning behind others team members' viewpoints. The function of learning behaviour is to gain and process data that allows a team to adapt and improve. This means that a higher level of learning behaviour should lead to improvements, which again could lead to higher performance.

The findings are also supported theoretically by Senge (2004) stating that superior performance depends on superior learning, and Friedman et al. (2003) who claim that organisational learning requires inquiry and openness. In the simulation, when meeting

problematic situations, Model II behaviour, which can be seen as analogue to learning behaviour, can increase the likelihood of double-loop learning, and the likelihood of an appropriate application of single-loop and double-loop learning.

Learning behaviour can also help to make tacit knowledge explicit. This leads to learning and knowledge creation, which again according to the previous statement from Senge should lead to higher performance.

But while learning behaviours explains 12% of the variance in performance, 88% is explained by other factors, meaning that the vast majority of variance finds its explanation elsewhere. We don't know what these factors are, or how much each of them would explain variance in performance, but let us take a look at some possible explanations.

What we do know about performance in teams, is that team effectiveness is influenced by structural features such as the design of team task, availability of information, resources, physical environment and appropriate team composition (Edmondson 1999: 1). Now, since the simulation is operated in a controlled environment, most of these features are the same for all teams. However, one question mark could be the team composition. Even if each team was composed in a way as to get the most even distribution on experience, geography and part of the organisation they work in, this could not be controlled for all possible factors. One thing that impacts group processes is the level of diversity, or homogeneousness or heterogeneousness. Two things are important when it comes to this. Firstly, heterogeneous groups tend to have more problems with communication than homogeneous teams. Secondly, heterogeneous teams seem to be better at creative tasks and innovation, while homogeneous teams seem to be better at implementation. If we see learning behaviour being related to communication, heterogeneous teams have conditions for exhibiting learning behaviour. With the second part, regarding creativity or implementation, it becomes a question of what is most important for performing well in the simulation, something I will come back to when I discuss research question 2.

So while there is no particular reason to suspect that the teams are so unevenly distributed when it comes to diversity, it can not be ruled out, and it might have an effect on the performance.

Another thing we know, is that teams need some time to settle in, to learn how to work together if you like (Hackman 2009: 101). There are theories for how teams develop over time. Typically, these describe team development as happening in stages (Wheelan 1994, Hjertø 2008). Tuckman, for instance, describes the stages as forming – storming – performing, where the last stage is where the team works best together and reaches its best performance (Hjertø 2008: 120). Since teams go through these stages at different rates of speed, this has implications for this study. First, the teams might be at different stages when learning behaviour is measured. This means that for some teams which are at an early stage in the development, learning behaviour might be measured lower than for others that might be at the performance stage, where cooperation and performance is at its best. Second, teams that go through the stages at a higher rate of speed than others might also have a relatively longer period of high performance, which again would positively influence the performance at the end of the simulation.

If the first implication is correct, it would impact the findings in this study, since this is only measured once during the simulation. If the second implication is right, it might both impact the findings in this study and be an at least partial explanation for the variance not explained by learning behaviour.

So what do the findings mean? For the participants in the simulation, which is still run in the company, it means that if they are able to exhibit learning behaviours like having good conversations, express the reasoning behind their viewpoints and ask for the reasoning behind others' team members' viewpoints, they have a higher likelihood of performing well. Also, it is likely that, according to Hackman, if they are able to exhibit these behaviours from the start of the simulation, the greater is the chance of them continuing to exhibit them.

We can imagine the participants meeting for the first time, five or six of them together in a room, about to carry out a task they have never done before. In that moment they set the tone for how they will work together for the rest of the simulation, and in that moment, not influenced by past performance, learning behaviour is one of the predictors of their success in the simulation.

Since this is done in a training situation, it is also an interesting question if learning behaviour could improve their learning, meaning that teams with higher levels of team behaviour will have learned more than teams with lower team behaviour when the training is over.

What are the implications for practice?

So what does this mean for practice? This is a question of generalisation and external validity. I have stated that the target population is organisations in general. So what can I say about this?

First let us look at the transformation of the findings from individual, to team and then to organisations. Let us start with the perspective of learning. There are different views on the relationship between individuals and organisations when it comes to organisational learning. Peter Senge, for example, has the group as one of the core disciplines of learning organisations (Senge 1990). But since organisational inquiry is one of the premises of this paper, it is natural to look to Argyris and Schön on this matter. They state that individuals can undertake learning processes like organisational inquiry that in turn result in learning outcomes on an organisational level, if the individual acts on behalf of the organisation and the resulting learning is reflected in the images of the organisation held in its members' minds, or in the organisations artefacts. So according to them, individual learning can result in organisational learning. This would mean that if individual learning is increased through learning behaviour it can become organisational as long as these conditions are met. When it comes to the team level, it seems illogical to assume that individual learning can be transferred to an organisational level, but not to team level. So it is my assumption that the learning can be transferred from individuals to both teams and organisations.

If we then go on to the perspective of performance, we find that according to Hjertø there are clear indications from research that increased performance in work groups gives increased performance in the organisations as a whole, and in general findings indicate that what is effective or ineffective for a team is effective or ineffective on an organisational level as well (Hjertø 2008: 100-101).

On a general level, these two points indicate that it could be possible to generalise the findings to organisations in general.

If we look at the characteristics of the simulation that are similar to that of situations in the real world, we find that the simulation is conducted under time pressure, where they have to make decisions in a competitive environment. Working in teams should be common also in real life. All these characteristics are common also for organisations outside the company from which the sample comes, and should increase the possibility for generalisation. In addition, the simulation is based on the company, so many of the features and problems should be well known, which further increases the possibility for the findings to be generalised to the at least to the company.

Characteristics that go against generalisation are that they are in an unfamiliar location, in a different context and with other people than usual and they work in teams with people they don't know from before. Time is suppressed, so that they go through the equivalent of 6 years business in 4 days. In addition, all of the respondents are from one company and therefore one industry and all are from a specific part of Europe. Something that specifically goes against generalising to the company is that even if it has similarities, the simulation is not an accurate representation of the company.

Methodically, the challenges are that the sample is a non-probability sample, so it is unsure whether the sample is even representative for company, not to mention organisations in general. In addition, the sample size is small, and the data is gathered from a simulation, which is experimental in nature

So what can we conclude from this? First of all, the fact that the findings are in line with findings from other companies and contexts is a strong indicator that the findings can be generalised to organisations in general. Also, we saw that both learning and performance is transferable to an organisational level. We also saw that many characteristics with the simulation is similar to real life. These things together are a strong indicator that the findings can be generalised to organisations in general.

What goes against this is first and foremost the fact that the data is gathered in a simulated environment, which is also the case with Iversen's findings. In addition, the small sample size presents a challenge to generalisation.

So all in all, there is a clear probability that the findings in research question 1 can be transferred to organisations in general. The probability for generalisations to the specific company is slightly higher, due to the fact that the sample is from the company, and that the simulation is tailored to represent the company.

One question remains though: If an increased use of learning behaviour has an impact on overall performance, how can learning behaviour be influenced? This is not part of the research questions, but I will address it briefly.

Edmonson presents two concepts that can explain an increase in use of learning behaviour, team psychological safety, which she defines as "a shared belief that the team is safe for interpersonal risk taking" and team efficacy which refers to the capability of the team to generate useful results with any revealed personal information. If these conditions are satisfied, team members are more likely to speak up and reveal personal errors (Edmonson 1999: 3-4). We can say that if in place, these two conditions reduce the likelihood of defensive routines appearing.

Through research, Edmonson found that psychological safety and team efficacy is positively associated with learning behaviour (Edmondson 1999: 10). So one way to increase the use of learning behaviour is to work to establish trust and team efficacy.

5.2 The impact of learning behaviour on strategy and performance

Now we go on to research question 2, the impact of learning behaviour on strategy and performance.

My second research question is: What is the relationship between learning behaviour, implementation of strategy, quality of strategy and performance? Does increased use of learning behaviour increase the use of both implementation factors and quality factors? And will an increased level of implementation factors and quality factors lead to improved performance?

In this model, learning behaviour is seen as the underlying driver for the factors quality and implementation. Quality factors are represented by question about experimentation, ability to utilise ideas and ability to learn from mistakes and successes, and are assumed to improve the quality for the strategy. Implementation factors are represented by questions about understanding of the strategy, commitment and implementation, and are assumed to improve the implementation of the strategy.

5.3 Research question 2

When testing the hypothesised model with structural equation modelling, I found that the model did not fit the data. Theoretically, the model seems to have some merit, but the data does not support it, so the hypothesised model must therefore be rejected.

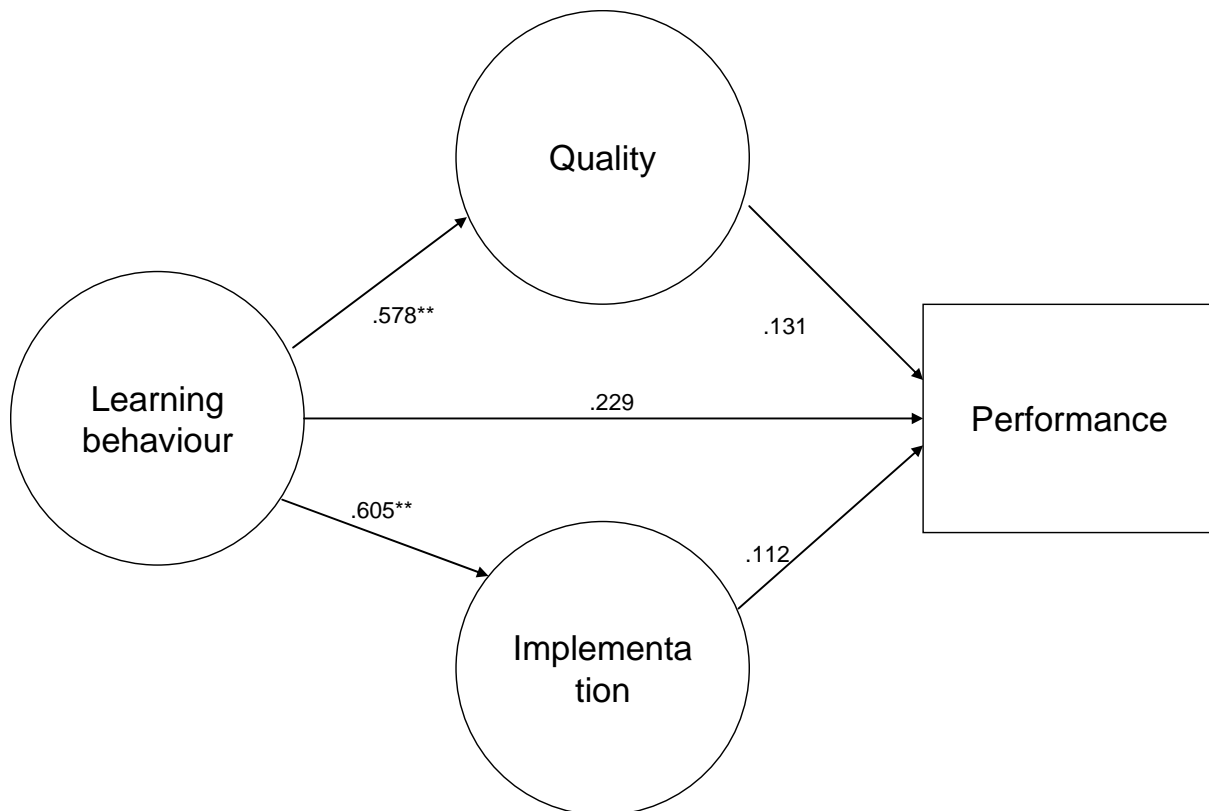


Figure 26: The relationship between the latent variable Learning behaviour, the two mediation variables quality and implementation and the observed variable performance from the business simulation. The results show: $\chi^2(96.514, n=72)=60$ and $p=0.002$ ($p<0.05$) with CFI = 0.889, RMSEA = 0.092 and SRMR = 0.096

One reason for the model not fitting the data can be that the theoretical model is fundamentally wrong. Another possibility is that the problem is multicollinearity. As stated before, this is a phenomenon in which two or more predictor variables in a model are highly correlated. This means that estimates become inaccurate, and makes it harder to show significant effects between variables.

Since the theory seems to support the general idea behind the model, I will explore the possibility for a modified model that will fit the data better, and is still theoretically well founded. This is as we have seen before, not unusual in structural equation modelling.

First, I tried out different sub-parts of the full model to see how the different relationships played out. Figures 16 to 18 are not new hypotheses, but steps in exploring the different relationships between the variables. This will in turn lead to a new hypothesised model.

First, a model without learning behaviour is tested (figure 16). This model does not fit data. This suggests that the model does not make sense without learning behaviour. The next two models, figures 17 and 18, separate implementation and quality, but incorporates learning behaviour. The model without quality has poor fit, while the model without implementation has good fit. In this last model, the correlations are significant. This indicates that there is a relationship between learning behaviour, quality and performance.

This model has good fit, and could explain 13% ($R^2 = 0.13$) of the variance in performance. Since this model fits the data, and can explain variance, I could have stopped here. But since I want a model would resemble the original hypothesised model, fit the data, and explain more of the variance in performance, I continue the exploration.

As written before, the problem with the original hypothesised model could be multicollinearity. To test this, I proceeded with Cholesky factoring to assess the unique predictive relationships between the three variables learning behaviour, quality and implementation.

In figures 19 to 22, we see that none of the Cholesky factoring models have acceptable fit, which mean that we can not use them to explain the relationships in the study.

Since Cholesky factoring did not yield satisfactory model fit, I tried a new approach, and combined variables to make a second-order factor. This new second order variable is called strategy, and consists of the first order variables quality and implementation. This second order variable is an expression for an interaction between the variables implementation and quality.

The first second order model, figure 23, also has good fit to data, but the only significant relationship is between learning behaviour and strategy, which explains 46% of the variance. So the model can not explain any variance in performance.

I then made the assumption that learning behaviour works indirectly through strategy, and modified the model accordingly.

The findings from this model show three things. First, the structured equation model fits the data well, and second, learning behaviour explains 49% of the variance in strategy, and strategy explains 16% of the variance in performance. Finally, the indirect effect from learning behaviour to performance is significant ($p=0.003$), and estimated to 0.28.

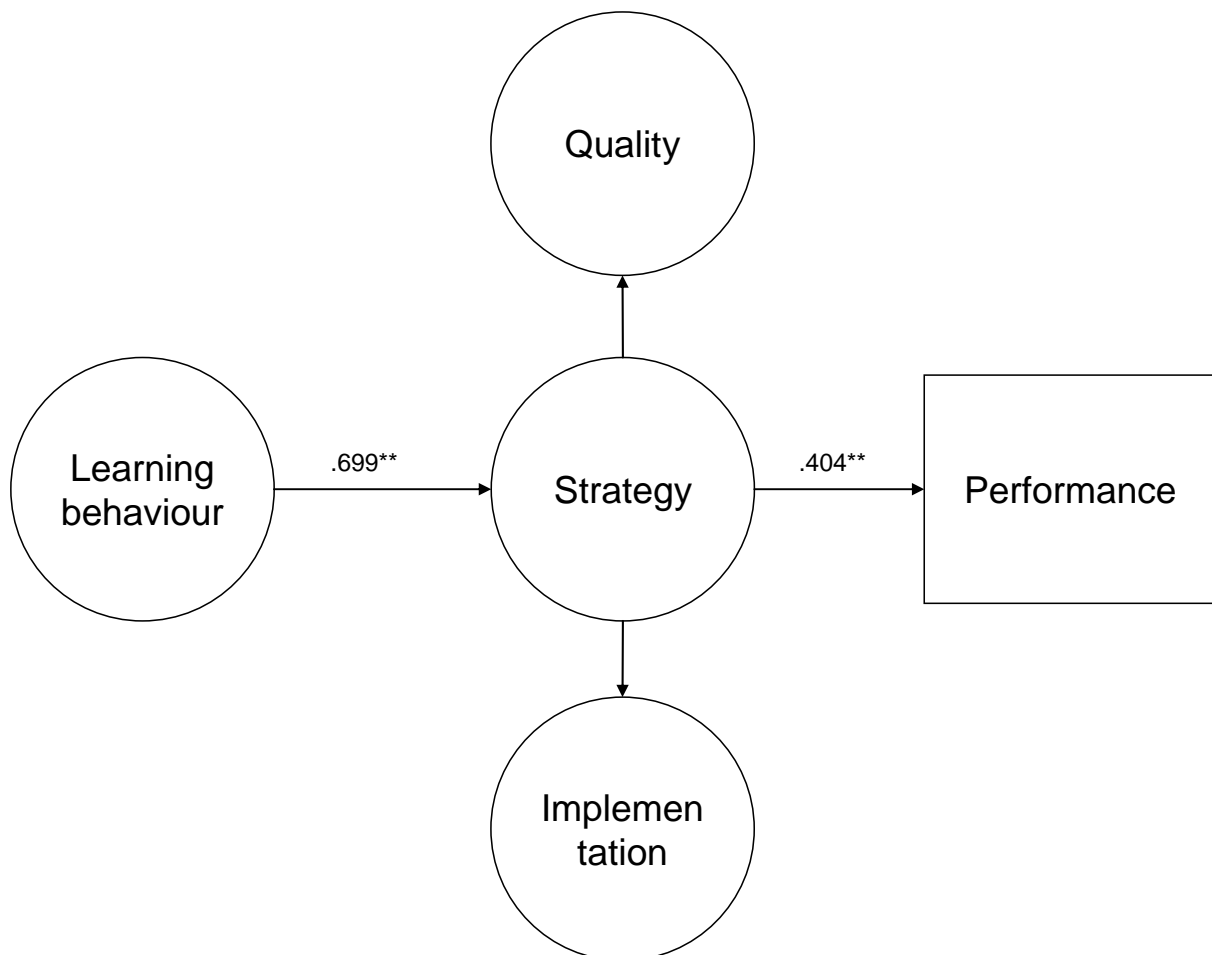


Figure 27: Second order model 2: The relationship between the latent variable learning behaviour, the second order variable strategy, and the observed variable performance from the business simulation. The results show: $\chi^2(70.645, n=72)=60$ and $p=0.164$, with CFI = 0.968, RMSEA = 0.050 and SRMR = 0.078

5.3.1 A second order model of strategy

Now I have a new model that fits data (figure 27). But how can it be explained that quality and implementation is combined into a new model?

One way to see it is that the new second order variable, consisting of implementation and quality, is an expression for an interaction between the factors implementation and quality. Now, seeing the two factors quality and implementation in combination should not totally surprising. Theoretically, there seems to be ample support for not separating quality and implementation.

Just by taking an extra look at the feedback loops in the strategy model based on Mintzberg (figure 11), I see that separating them might be difficult. As Mintzberg et al. states, good ideas, which could become good strategies, needs to be tried out, feedback be received, and from this we can learn what works and what doesn't. The limitations of the strategy can only be discovered when the actions are taken, and it is through this kind of strategic learning an organisation can find out what its strengths and weaknesses are, and it is through this we can learn what is good strategy and what is not, not separating strategy and implementation, but using implementation as a way of experimenting in learning. Often, formulation and implementation activities are intertwined with one another, and not formulated first and then implemented, but rather it is done in incremental steps of thinking and acting (de Wit and Meyer 2005). And it does seem to make sense that a strategy of high quality has to be implemented, and that good implementation increases its effect on performance if the strategy is of good quality.

So by combining quality and implementation we get a model that fits the data and explains variation in performance, and that has support in theory. The downside is that we loose some information in the process. In the model, it is not possible to explain the specific explained variances from quality and implementation to performance. Still, since the model has good fit and is grounded in theory, the model is acceptable.

When it comes to causality, the reasoning has to be divided in two, and we start with the last part of the model, the relationship from strategy to performance. Here, all three of Schumacker and Lomax' (2004) conditions for causal relationships are fulfilled, indicating that there is a causal relationship from learning behaviour to performance. Still, one could make the same argument here as regarding causality from learning behaviour to performance in research question 1. Here there is no research to contradict the causality from strategy to performance, but this study is not designed to do the same test of causality as Iversen i her study. But I could make the same argument as in research question 1, that when the participants start their work together, they have no previous experience or performance from which quality or implementation can be influenced.

This means that while I do not dismiss the possibility that strategy could be influenced by performance, my argument above and the fact that the conditions for casual relationships are fulfilled, inclines me to stick to my conclusion that the findings indicate that learning behaviour predicts performance.

When it comes to the first part of the model, the question of causality from learning behaviour to strategy, only two of the conditions for causal relationships are fulfilled, because there is no temporal order between the variables. Now, MacCallum and Austin argue that it is not unusual that the time lag in which the causal effect operates is effectively instantaneous, thereby justifying the interpretation of a causal effect. But even if it can be justified, the causality has to be based on theory and the existence of covariance, making the argument for causality less strong.

In chapter 2, the case for the relationship between learning behaviour was made, and based on this; I choose to stick with the interpretation that learning behaviour is a causal effect for strategy, but also acknowledging that the causality is discussable.

When it comes to explained variance, learning behaviour explains 49% of the variance in strategy. This explanation is substantial, but perhaps not surprising since the task of the participants in the simulation is to formulate and implement strategy.

When we come to explained variance on performance, the model explains 16%. This is higher than I found learning behaviour to explain in research question 1, but the increase in

explained variance from 12% to 16% is slight, with adding strategy as a variable only explaining 4% more than with just learning behaviour. This means that factors outside the model explain 84% of the variance in performance. Since formulating and implementing strategy is the explicit task of the participants, one could have expected that the variable strategy would explain more of the variance in performance. Why the increased explanation in performance is not larger is hard to say, but when it comes to the quality and implementation of strategy, three explanations come to mind.

The first one has to do with strategy models. There is an abundance of strategy models and tools on the market that can be used to improve your strategy (see for example Porter 1996 and 2004, Treasy and Wiersma 1993). Now, how experience and skilled people are in using these models and tools could explain part of the remaining variance in performance.

The second explanation has to do with planning, and with structure and control (see for example Kaplan and Norton 2005). Again, the experience and skills in planning, structuring and controlling implementation could explain part of the remaining variance on performance.

The third explanation has to do with both quality and implementation, and is the analytical capabilities of the participants. In the simulation, the participants have to analyse, digest and make sense of large amounts of numerical data. The ability to do this could also explain part of the remaining variance.

These three things are abilities the participants might or might not have, that influences performance without being part of what is measured in this study.

The explanations regarding team work mentioned in the discussion of research question 1 could also be in play here. Of special interest is the tendency of heterogeneous teams seeming to be better at creative tasks and innovation, while homogeneous teams seem to be better at implementation. This could mean that a well balanced team has better chances of doing both things well, and could explain variance in performance.

Given that the teams in the simulation were distributed in a way as to minimise diversity between the teams, there is no particular reason to suspect that the teams are so unevenly

distributed when it comes to the explanations above, but it can not be ruled out, and it might have an effect on the performance.

What are the implications for practice?

Again, I have stated that the target population is organisations in general. So what can I say about this? The question of generalisation raises the same issues as in the discussion in research question 1. Both the issues indicating that generalisation is possible (such as the ability of learning and performance to become organisational, and the characteristics of the simulation that are similar to that of situations in the real world) and the issues indication that generalisation is difficult (such as the small sample size, the experimental nature of the simulation) are present in this research questions. In addition, the fact that I have not found any research of similar nature as in this study makes it harder to make generalisation outside the context where the data was gathered.

To conclude, generalisation to the simulation is quite probable, meaning that in the simulation, increased use of learning behaviour will probably increase the use of both implementation factors and quality factors, which again will probably lead to improved performance.

Generalisation to the specific company is less probable, but still quite possible, since the sample is from the company, and that the simulation is tailored to represent the company.

Lastly, the findings indicate that an increase in learning behaviour and strategy increases performance also for organisation in general, but the extent to which it can be generalised is not as high as for the direct relationship from learning behaviour to performance

5.4 Study limitations

Some of the limitations with the study, such as the small sample size and the problems with generalising from an experimental situation to real life have already been mentioned. Another limitation that has been mentioned is the fact that learning behaviour and quality and implementation factors are only measured once, making it more difficult to establish causality.

An important limitation that has not been mentioned, is that the study is self-referential, and what that what the study measure is the participants experience of learning behaviour and quality and implementation factors, not what they are actually exhibiting. This means that the study depends on the participants' understanding of the situation and themselves, and that it is not "the truth" that is measured, but the different participants' perception of the situation (Lund et al. 2002: 149). This problem is also mentioned by Phil Rosenzweig, who claims that retrospective self-reporting is commonly biased by performance. This point has been adressed in both the chapter on scientific methodology and in the discussion regarding the findings, and I have explained what measures I have taken to avoid this, and to what extent I think Rosenzweig claim is justified for this paper.

Anyway, this was the only available method of data collection, as already stated, and on the other hand, who would know better how the situation is than those actually experiencing it?

6 Conclusion

The theme for this study was organisational learning and strategy, and more specifically, it was about the relationship between learning behaviour, strategy and performance.

The findings in the study support previous research by indicating a positive relationship between learning behaviour and performance. The causality in this relationship is debatable, but I have argued for causality from learning behaviour to performance.

Regarding the second research question which is about the relationship from learning behaviour to quality and implementation, and then to performance, the initial hypothesised model had to be rejected due to poor fit to data. After exploring the possibility for a modified model that fits data and is grounded in theory, I ended up with a second order model, with a second order variable called strategy combining quality and implementation. This model, which shows the relationship from learning behaviour to the new variable strategy and then to performance, had good fit to data and was accepted.

The relationship from learning behaviour to performance was known from previous studies, while the final and acceptable model for research question 2 has not to my knowledge been subject for research previously. The findings in this model indicate that this could be a promising area for future research.

If I was to conduct a new study, I would first of all measure learning behaviour and strategy factors at two different times to be able to conduct a better analysis of causality. Measuring learning behaviour and strategy factors after decision 1, but before they receive the results from their first decision, would enable the measurement of these factors before they could be influenced by performance. Secondly, I would try to find a way to measure the actual quality and implementation of strategy, to better see the relationship between learning behaviour, strategy factors, strategy and performance. This is not easy, but the use of analysts with deep knowledge about strategy and the simulation to analyse the teams actual quality and implementation could be an option, even though this would take a lost of resources.

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Questionnaire

Please rate to which extent you agree with the statements below on a scale from 1 (not at all) to 5 (very much). The questionnaire should be answered individually.

Questions about team behaviour					
1. We express the reasoning behind our viewpoints	1	2	3	4	5
2. We seek the reasoning behind other team members viewpoints	1	2	3	4	5
3. We have a climate for expressing alternative viewpoints and challenging each other	1	2	3	4	5
4. We take the time to listen to each other	1	2	3	4	5
5. Each of us has the opportunity to speak their mind	1	2	3	4	5
6. We have good discussions	1	2	3	4	5
Questions about implementation					
7. We understand our strategy	1	2	3	4	5
8. We are committed to our strategy	1	2	3	4	5
9. We implement our strategic decisions	1	2	3	4	5
Questions about strategy process					
10. We have room for experimentation in our strategy process	1	2	3	4	5
11. We are able to utilize ideas emerging throughout the simulation	1	2	3	4	5
12. We are able to learn from our mistakes and successes	1	2	3	4	5