2nd International Conference on Path Dependence

Freie Universität Berlin, School of Business and Economics

March 3 - 4, 2011

Consumer Path Dependence in High-Tech Markets

An Analysis of the Self-reinforcing Mechanisms Leading to Consumer Lock-in

Abstract

This paper focuses on consumer decision-making and the mechanisms that drive consumer path dependence. Path dependence theory investigates processes driven by increasing returns. These positive feedback mechanisms can potentially lead to an inefficient lock-in situation. An available better alternative cannot, or only with difficulties, be attained. The aim of this project is to broaden the range of path dependent theory by applying it to consumer decisions in high-tech markets. A computer-based experimental study showed that consumer path dependence is driven by three underlying mechanisms: learning effects, complementarity effects and adaptive expectations effects.

Keywords

Consumer decision-making, consumer lock-in, path dependence theory, increasing returns, high-tech products

INTRODUCTION

This project brings together path dependence theory (David 1985, 1986; Arthur 1989, 1994) and consumer decision-making. In short, path dependence theory states that previous choices influence and restrict future choices. It can be conceptualized as the outcome of a dynamic process, which main driving forces are positive feedback mechanisms (Sydow et al. 2009). These feedback mechanisms, as beneficial as they may seem in the beginning, can have negative side effects**,** by narrowing and restricting future choices. As a result, they can lead into a potentially inefficient lock-in situation. An available better alternative cannot, or only with difficulties, be attained; one is 'locked-in'.

Although the theory has been widely applied and accepted at the field and organizational level, and often in technological contexts, it has up to now rarely been studied on the individual level (Farris et al. 1998; Koch et al. 2009). As Sydow et al. (2009) claim: "*…individual path dependence theory still awaits elaboration.*" The aim of this paper is therefore to broaden the range of path dependence theory by applying it to the individual level. The argument is that a modified theory of path dependence can be applied to lock-in phenomena observable in consumer decision-making. This research focuses on phenomena where decision-makers stick to a choice even though there is a potentially better alternative available. It is hypothesized that consumer path dependence, just as organizational path dependence, is driven by several self-reinforcing mechanisms, which lead the individual into a lock-in situation. In order to investigate on the effects of self-reinforcing mechanisms on consumer path dependence, an experimental study has been conducted. By doing so, the project also adds a methodological contribution by using experimental research for research questions concerning path dependent processes instead of the commonly used qualitative case-study design or simulations (Vergne & Durand 2010). Overall, the project responds to the conference call for discussion and analysis of new areas for path dependence research. It sheds light on how consumers can get locked to a certain product, when self-reinforcing mechanisms are at play. As lock-in situations can have far-reaching consequences for both consumers and

marketing practitioners, the projects focuses on identifying the mechanisms which are responsible for path dependent processes in high-tech markets.

PATH DEPENDENCE THEORY

Path dependence (David 1985, 1986; Arthur 1989, 1994) can be conceptualized as the outcome of a dynamic process, which main driving forces are self-reinforcing mechanisms (Sydow et al. 2009). These positive feedback mechanisms can lead to a narrowing and restriction of choices: previous decisions influence and restrict future decisions (Schreyögg et al. 2003). In short: “history matters”. These feedback mechanisms, as beneficial as they may seem in the beginning, can have negative effects, by leading into a potentially inefficient lock-in situation. Here, the decision for an inferior alternative cannot or only with difficulties be altered; one is ‘locked-in’. In organizational research the concept has been mostly applied to all kinds of imprinting effects, which have an impact for organizational behavior. Sometimes used as a rather vague metaphorical term, it has been applied as an explanatory device in studies highlighting all cases of persistency and irreversibility of organizational strategies or routines. However, the concept is supposed to mean more than merely ‘past-dependence’ (Antonelli, 1999). Its main focus lies in the importance of past decisions for future decision with self-reinforcing mechanisms as the main drivers of the process. The framework offered by Sydow et al. (2009) suggests three development phases of organizational path dependence: (1) A singular starting event, which under certain conditions transforms itself into (2) a self-reinforcing dynamic leading to a (3) non-reversible state or lock-in (see figure 1). The suggested 3-stage model was developed to explain organizational lock-in, however other levels of analysis are also of great relevance. As all organizational behavior can be traced back to individual behavior, this project broadens the range of path dependence theory by applying it to the individual level of analysis and analyzing path dependent processes in consumption decisions.

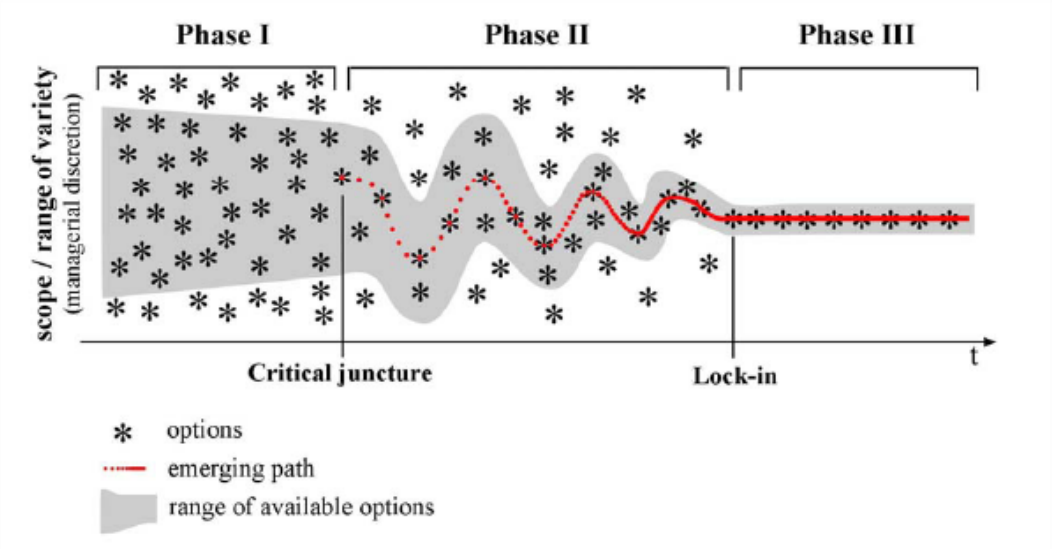


Figure 1: 3- stage model of path dependent processes (Sydow et al. 2009)

PATHS IN CONSUMER DECISION-MAKING

Path dependence theory has so far not been applied sufficiently to consumer behavior processes. However, some studies have dealt with consumer lock-in situations without necessarily making use of the terms related to path dependence theory as Arthur (1989, 1994) and David (1985, 1986) have introduced it. Murray and Häubl (2002, 2007) have studied consumers' switching behavior in electronic marketplaces. Contrary to common opinion, the increased possibility to search for the lowest price online does not reduce consumer loyalty. What they found was that consumers engage in only limited search and stick to the one web store that they know. This has been attributed to a phenomenon called cognitive lock-in (Häubl and Trifts 2000; Zauberman 2001). It refers to the idea, that even if consumers would have the opportunity to switch to a different and potentially better offer, they stay with the store, which they have some degree of experience with. This type of loyalty can be traced back to certain skills that users learn while using, for example a certain website, for the fist time. As they have invested time and effort to learn about a certain choice environment, they are less keen to switch to a different one. Murray and Häubl (2007) investigated the process of user skill acquisition over time and their choice among several online stores. The results of their research

show that consumers tend to prefer the one website they have more experience with compared to other sites. They call this type of loyalty *skill based lock-in*. They also differentiated between transferable- and non-transferable skills, with the acquisition of non-transferable skills leading to an even stronger lock-in situation. Similar results are suggested by studies from Johnson et a. (2003), who find out that even if 'the next shop is just a mouse-click away' people to not tend to shop around online, but exhibit strong loyalty for few stores. Both streams of research suggest that learning effects do play a crucial role in the development of consumer path dependence.

In a more recent study Tellis et al. (2009) look at the impact of network effects on potential lock-in situations in high-tech markets. High-tech products usually are being ruled by one dominant standard (Eisenmann et al. 2006). Prominent examples are Microsoft Windows, VHS videotapes, Blue-ray and the QWERTY keyboard. If only one alternative survives, it is of crucial importance for researchers as well as practitioners to know about the drivers of success of new high-tech products. Tellis and colleagues (2009) try to investigate whether, in general, the best quality brand wins in the end, or if high-tech markets show path dependence. They look at network effects in particular, which they define as the number of other users choosing the same brand. They conclude that these markets are generally efficient, but that network effects play a crucial role in determining the dominant standard. Thus, the literature is divided about whether path dependence in high-tech markets exists or not. If there is the possibility of decision-makers becoming stuck to an inferior alternative it is important to study the factors that influence and maintain such a lock-in situation. Therefore, the impact of network effects on path dependent processes has not been solved yet, but seems to be worthwhile for closer investigation.

Other research has tried to take context factors into account, which may lead to path dependent processes. Koch et al. (2009) investigate in their paper the relationship between environmental complexity and path dependency by means of an experimental study. By focusing on information load and decision quality in several decision rounds, the study explores the impact of complexity on decision-making processes. Results show that different levels of complexity do affect decision behavior and help to better understand the

development of path-dependent behavior. They also offer new insights into decision-making behavior under conditions of increasing returns in different settings of complexity. Altogether theses projects show the relevance of implementing path dependence theory into the research of individual decision-making.

MECHANISMS ON THE INDIVIDUAL LEVEL

Self-reinforcing mechanisms lie at the heart of path dependence theory, as the continuation of a path can be explained by one or a combination of several self-reinforcing mechanisms. Therefore this paper tries to identify the mechanisms that contribute to consumer path dependence. On the macro-level (Arthur 1994) and organizational level (Sydow et al. 2009) a range of self-reinforcing mechanisms, which can lead in to a lock-in situation, have already been identified, namely learning effects, complementarity effects, adaptive expectations and coordination effects. For the purpose of studying individual decision paths, these same mechanisms have to be translated into mechanisms applicable for the individuals and their decision-making. Moreover, in order to test their impact in an experimental design, the mechanisms have to be operationalized to be quantifiable. The first column in table 1 gives an overview of the four main mechanisms of organizational path dependence (Sydow et al. 2009), the second column indicates their respective translation into the individual level and the third column gives details about their operationalization.

Organizational path dependence	**Individual path dependence**	**Operationalization**
Learning Effects	Learning Effects	▪ Amount of experience
Complementarity Effects	Complementarity Effects	▪ Number of complementary products

Adaptive Expectation Effects	Adaptive Expectation Effects	▪ Percentage of other decision-makers choosing the same option
Coordination Effects	Internal Consistency	▪ Preference-for-consistency
-	Personality Traits	▪ n.a.

Table 1: Self-reinforcing mechanisms of path dependence

It becomes evidently that most of the mechanisms can be transferred directly to the individual level. Only the fifth mechanism (personality traits) is an additional mechanism, which is only related to the individual level and not applicable for the study of organizational paths. The third column indicates how each mechanism can be operationalized, which is the basis for the empirical study conducted to test consumer path dependence. The following paragraphs will explain each mechanism and their meaning for both the individual level and the consumption context.

Learning effects imply that an act is performed more efficiently the more often it is done. At the same time the currently chosen alternative becomes more attractive as skills are being accumulated and the average costs of output decrease. A well-known example building in this self-reinforcing dynamic from organizational research is the focus on exploitative learning. Instead of looking for different alternatives, it becomes more accepted to stick to the same practice. But by focusing on the acquisition of learning advantages, new opportunities are likely to be missed. On the individual level, learning effects are often related to the acquisition of certain task-related skills (Murray & Häubl 2002, 2007; Johnson et al. 2003). Also here they can lead to repetitive behavior, narrowing the scope of future choices.

Complementarity effects on the organizational level relate to the synergy resulting from the interaction of two or more separate but interrelated resources, rules or practices (Pierson 2000; Stieglitz & Heine 2007). A known general example are economies of scope: they relate to a situation where the cost of combining several products is lower than the cost of offering them separately. In an organization this can be two departments, which through intensive teamwork produce an output worth more than the two departments would produce separately. In the future this could become a core competence of the organization: very attractive to exploit and very likely to become path dependent. Similarly, on the individual level it relates to the additional benefit the interaction of certain objects or choices offer. As complementarities they do not simply add up but produce an additional surplus, like network effects in the context of certain product choices.

Adaptive expectations effects relate to the idea, that people build their preference in response with the expectations of others, and prefer what they think others prefer too (Leibenstein 1950). The interactive building of preferences can be explained by the need for social belonging and social acceptance and the desire to end up on the side of the winners. Although neoclassical economic theory assumes fixed individual preferences, reality shows a different picture. Especially when people are uncertain about the right choice, they follow the majority choice. At the same time, like a self-fulfilling prophecy, they signal superiority to others. This can exhibit a self-reinforcing dynamic leading to one dominant solution.

Personality Traits are individual difference variables, which differ amongst various people and can be associated with certain behavior of a person. Personality traits, which are assumed to influence path dependent behavior, are: preference-for-consistency, risk-aversion, innovativeness, variety-seeking and need for cognition (NCF), as NFC may influence the degree of risk taking (Kuvaas & Kaufmann 2004, Lin et al. 2006). In the experimental study it will be tested, if these variables indeed have an impact on the likeliness of people to become path dependent. **Internal consistency** directly corresponds to the coordination effect on the organizational level, which stresses the advantage of an internal fit among the various elements of an organization (Miller &

Friesen 1984). It was initially put forward to describe the advantage of rule-guided behavior: the more actors adapt a certain rule, the more efficient is the interaction among them, as reactions can be anticipated and uncertainty can be reduced. As a result costs will decrease and it becomes attractive to apply the same rules in order to interact with these actors. Over time a specific pattern of practice is likely to emerge. On the individual level it relates to a certain personality trait: the 'preference-for-consistency' (Cialdini et al. 1995). It describes to what degree people tend to base their current reaction on prior behavior, in order to feel consistence in their behavior.

METHOD

The Research Object: Decision for Smartphones

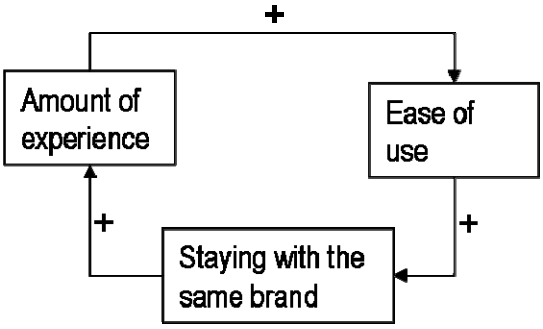
As research object for the experimental study I chose consumer decisions for mobile phones, more specifically smartphones. Markets for high-tech products are usually characterized by a hardware component – in the case of smartphones this equals the mobile phone – and a number of software products which can be used in connection with the hardware – in the case of smartphones this equals the applications. The interactions between the hardware and the complementary software are likely to play an important role in the constitution of a path, as the complementarity effect indicates. High-tech products usually also exhibit another characteristic: most high-tech markets are being ruled by one dominant standard and are so-called 'winner-take-all' markets (Eisenmann et al. 2006). Most researchers agree that standard battles in high-tech markets are to a great extend influenced by the preference of early adapting consumers. However, despite much research on product diffusion and network effects on supply side actors, the consumer side remains largely unexplored (Tellis et al. 2009). Since empirical studies have not yet tackled this issue sufficiently, this project aims at answering the question if consumers can get path dependent and if so, what the underlying mechanisms are that influence their preference for one high-tech alternative over another. The product category 'smartphones' is therefore particularly suited for research concerning path dependent processes, as available studies have come up with mixed results.

Hypotheses

In order to analyze potential self-reinforcing mechanisms on the decision-makers side, the self-reinforcing mechanisms (learning effects, complementarity effects, adaptive expectation effects and internal consistency) are applied to the context of consumer decisions for smartphone products. The following hypotheses will be tested in the empirical study. As noted above, these mechanisms steam from research done on the organizational level as well as studies on individual decision-making.

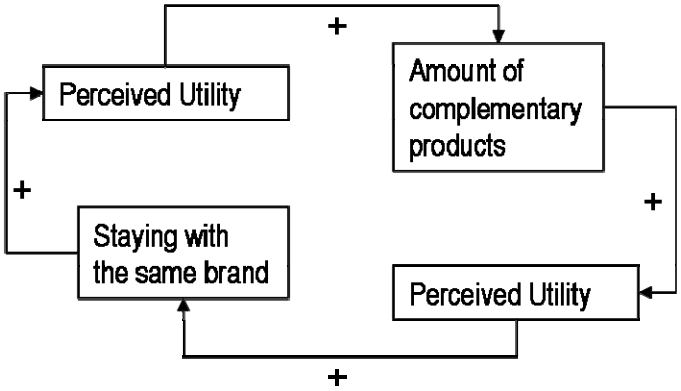
Learning effects are related to the acquisition of certain skills concerning a consumption task, which can lead to skill-based lock-in (Murray & Häubl 2002, 2007; Johnson et al. 2003).

H1: A higher amount of experience leads to an increased ease-of-use, which enhances path dependence.



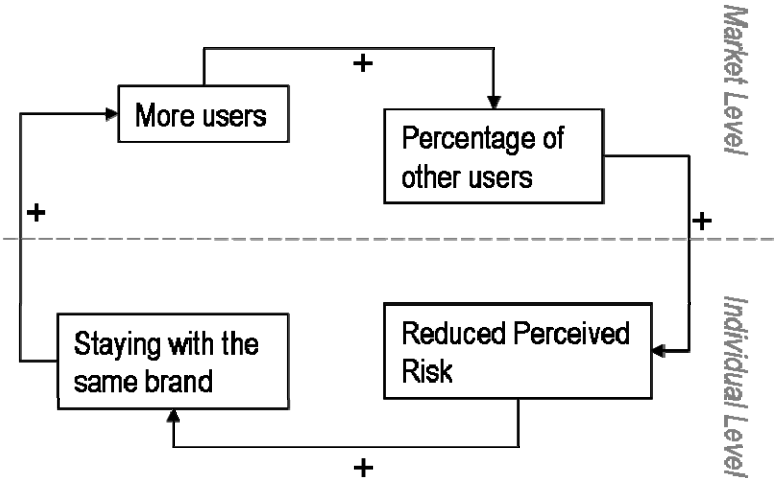
Complementary effects arise when the utility of a base product increases with the use of a complementary set of compatible goods. In turn, the utility of the complementary products increases with the use of the base product. Together, they lead to an overall increase in consumer utility (e.g., see Farrell & Saloner 1985, Katz & Shapiro 1985).

H2: A higher amount of complementary products leads to increased perceived consumer utility, which enhances path dependence.



Adaptive expectation effects (or social contagion) relate to the fact that people build their preference in response with the expectations of others, and prefer what they think others prefer too (Leibenstein 1950), also as a means of reducing uncertainty (Kulik et. al 2008). Therefore as more users choose one alternative, the more people will follow their decision.

H3: A higher percentage of other decision-makers choosing the same option leads to decreased perceived risk, which enhances path dependence.



Preference-for-consistency is a personality trait associated with path dependence. It is viewed as "a tendency to base one's responses to incoming stimuli on the implication on existing (prior entry) variables, such as previous expectancies, commitments and choices" (Cialdini et al. 1995, p. 318). To measure this effect, the preference-for-consistency scale (Cialdini et al. 1995) is applied.

H4: A higher preference-for-consistency enhances path dependence.

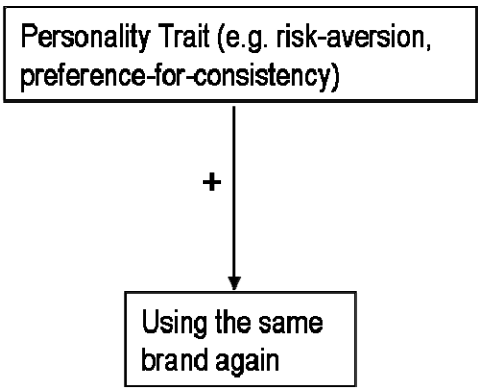


Figure 2 gives an overview of the four mechanisms leading to individual path dependence. In order to empirically test these hypotheses, each variable has to be operationalized and manipulated. Learning effects are manipulated by the amount of experience, meaning how many times each participant has used the smartphone. Complemen-

tarity effects are manipulated by the amount of complementary products, in the case of smartphones, this equals the amount of applications available for the phone. Adaptive expectations are manipulated by the percentage of other decision-makers choosing the same option. In the experimental study, the participants are being told how many other decision-makers have chosen the same smartphone. Personality traits, for example preference-for-consistency, cannot be manipulated. Instead they were measured at the end of the study using the appropriate scales from psychological research.

Together these mechanisms can be combined to a model of consumer path dependence - each having an impact on individual path dependence and consistent choice. Figure 2 shows the suggested model of consumer path dependence. The first three mechanisms are expected to be self-reinforcing: A higher amount of experience leads to a higher ease of use, a higher amount of complementary products leads to a higher perceived utility, and a higher percentage of other users leads to a lower perceived risk. However, the personality traits are not self-reinforcing as they are more or less stable over time. Nevertheless, as they have significant impact on individual behavior, they are tested for potential impact on path dependence.

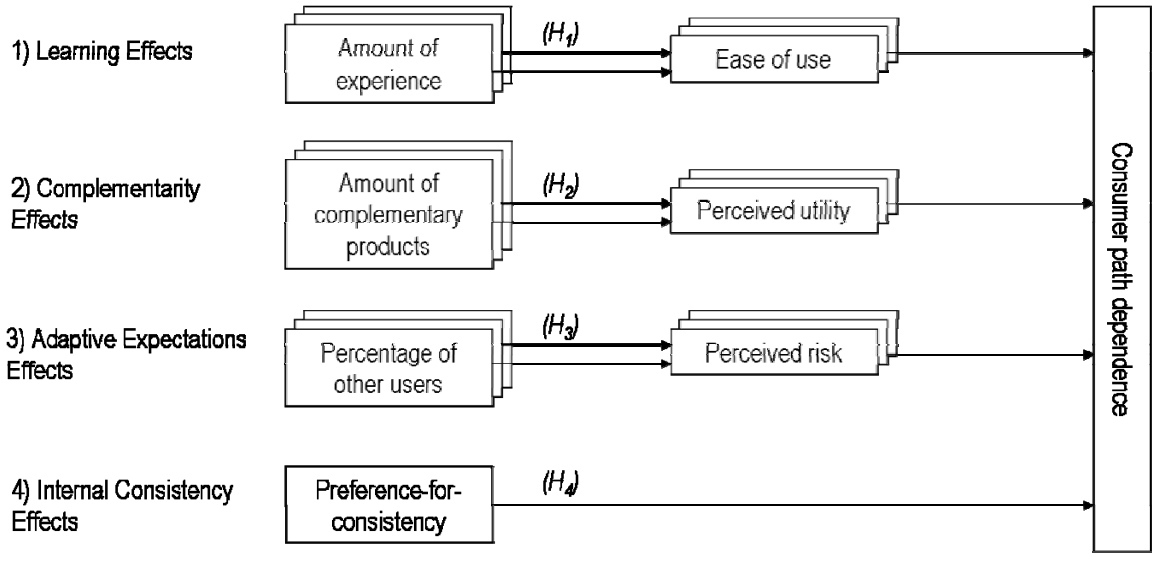


Figure 2: Model of consumer path dependence

Procedure

In order to answer the research questions, and to empirically test the hypotheses, a computer-aided experimental study has been conducted. The aim was to find out which mechanisms have a significant influence on consumer path dependence, and how strong the impact of each mechanism is. As research object I chose the consumption decisions for smartphones as all four mechanisms are applicable to consumption decision and can be tested in this context. At the same time, the underlying approach can be applied to any brand related decision-making process.

The experiment was based on a three-factorial between-subjects design, manipulating the experience with the product (learning effect), the number of available complementary applications (complementarity effect) and the percentage of other users (adaptive expectation effect). The personality trait variables (e.g. preference-for-consistency) were measured using the appropriate scales. Hence, the experiment is based on a 2x2x2 research design.

228 university students (52,6 % female, mean age = 23,6) participated in the study and were randomly assigned to one of the experimental groups. The experiment took place in a computer lab and all necessary information was given on the computer screen. Participants were told that they have to make eight consecutive purchase decisions between two competing smartphone brands (Smartphone-A and Smartphone-B). They were told that they were testing a fictitious new rental model for smartphones and that they could choose a new smartphone every 6 months. Once they had chosen a smartphone, they had to use it and find a particular menu-item. Both smartphones had different menus, so that participants would experience a leaning curve for the one menu they used more often. In the beginning the two alternatives were equal, but over time one of the two smartphone-options (Smartphone-B) was objectively superior, which was manipulated in two ways. Firstly the fictitious rental price for both alternatives decreased but stronger so for Smartphone-B. Secondly, participants were shown a test result from an independent consumer test company (*Stiftung Warentest*), indicating that Smartphone-B is of better quality compared to Smartphone-A.

Variables Measured

As the number of complementary products and percentage of other people using the same option are manipulated, the decision environment constantly changes. At the end of each decision-round the dependent variables were measured, in order to track any changes in value over time and thus to investigate whether the mechanisms are indeed self-reinforcing. Hence, it was measured if an increase of experience induces increased ease of use (measured by the number of mistakes to fulfill the task) which leads to consistent consumption choice (learning effect), if the amount of complementary products (applications) induces an increase in the perceived utility (17-point Likert scale) of the product which leads to consistent consumption choice (complementary effect), and if an increase in the percentage of other users induces a decrease in perceived choice risk (17-point Likert scale) and an increase in perceived security (17-point Likert scale) which leads to consistent consumption choice (adaptive expectations effect) and if a high preference-for-consistency leads to consistent consumption choice (internal consistency effect). As mentioned before, individual path dependence is conceptualized as staying with the same choice although there is a better alternative available. The objectively superior option (Smartphone-B) is manipulated in the experiment by having a lower price and a higher quality. If people switch to the better option they show the rationally expected behavior. However, if people stick to their initial choice (Smartphone-A), they demonstrate path dependent behavior.

RESULTS

The data collected in the experimental study was analyzed using logistic regression method. The dependent variables were coded as either 1 (path dependent) or 0 (not path dependent). The intervening effects were analyzed using mediator-tests (Baron & Kenny 1986; Sobel 1982), with *a* being the regression coefficient for the association between independent variable and mediator, *b* the coefficient for the association between the mediator and the dependent variable and *c* the regression coefficient for the association between independent variable and dependent variable. Figure 3 shows the

results for each variable in the last decision round. As can be seen from the figure the **amount of experience** with the product does have a significant main influence on path dependence (c = 0,710; p<0,1) and also a significant effect on ease of use (a = 0,269; p<0,01). However, ease of use does not serve as a mediator for the learning effect. Hypothesis 1 is therefore only partially confirmed. The **amount of complementary products** does have a significant main effect on path dependence (c = 1,214; p<0,01) and this effect vanishes if the variable perceived utility is added to the equation. The effect is therefore completely mediated by the perceived utility of the consumer (p<0,1) and hypothesis 2 is confirmed. The **percentage of other users** does have a significant main effect on path dependence (c = 1,321; p<0,01). The mediation effect is confirmed both for perceived risk (p<0,1) and perceived security (p<0,05). Hypothesis 3 is therefore also confirmed.

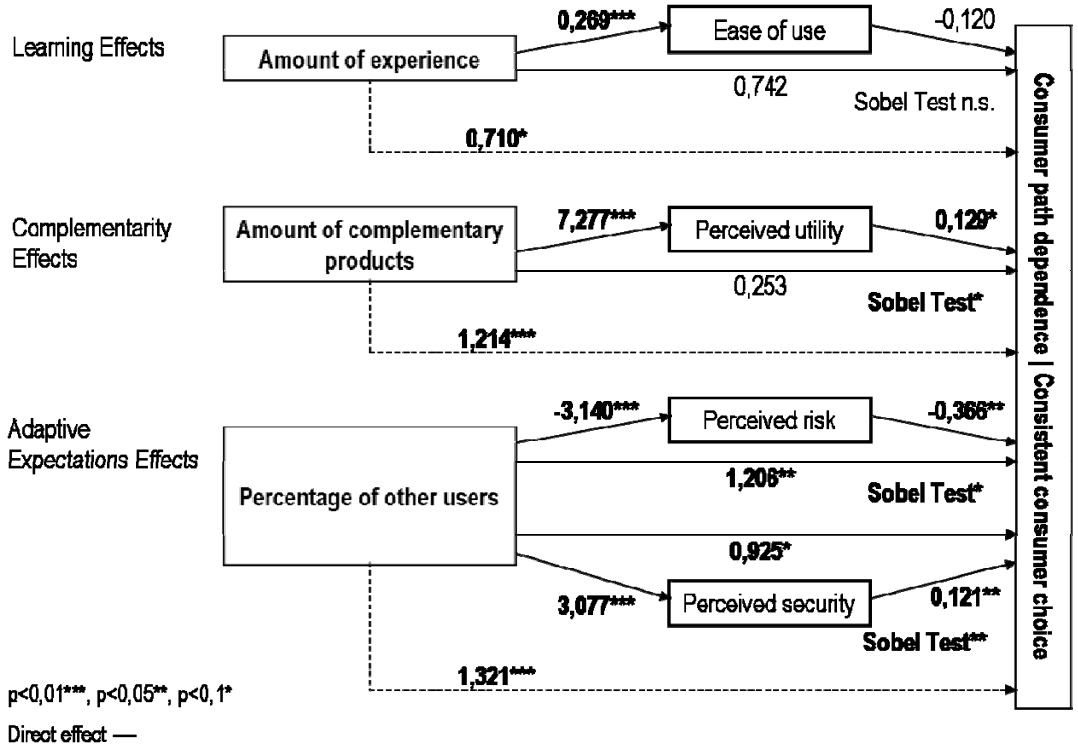
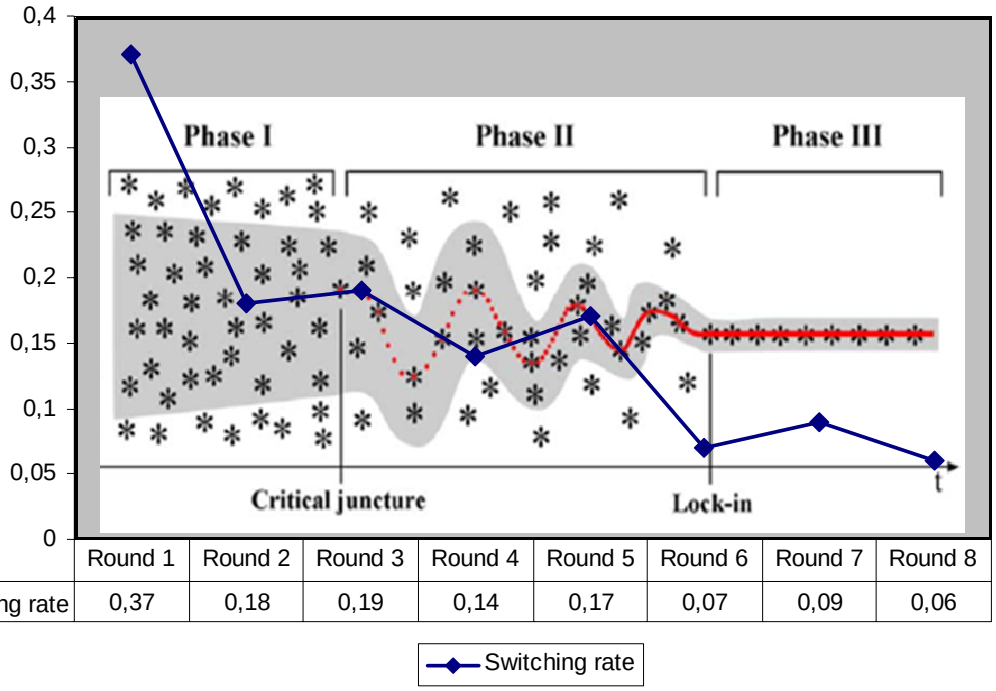


Figure 3: Regression results

The influence of the internal consistency was measured using the **Preference-for-Consistency** Scale (Cialdini et al. 1995). The scale indicated sufficient reliability

(alpha = 0,87). Preference-for-consistency proofed to have a significant influence on path dependence (β=0,508; p<0,05), with individuals scoring higher on the scale being more likely to become path dependent. Hypothesis 4 is therefore confirmed.

As an additional analysis the switching rate of participants was measured by counting total incidents of switching per decision round. Figure 4 shows the switching rate per round (total switching divided by number of participants). As the figure shows, switching strongly decreases over time, with a high switching rate in the first round, medium rates of switching in the middle and very low switching rates in the last three rounds. This nicely reflects the 3-phase model of path dependent processes, were the range of decision possibilities decrease over time with a lock-in situation and the end of the process.



	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8
Switching rate	0,37	0,18	0,19	0,14	0,17	0,07	0,09	0,06

Switching rate

Figure 4: Switching behavior

CONTRIBUTION

The findings of this research are a contribution to the range of application of path dependence, as it connects the theory of path dependence to consumer decision-making. It is helpful for both the development of path dependence theory and for a better understanding of choice behavior. It specifically provides an interdisciplinary contribution to explain the driving mechanisms of individual path dependence and lock-in situations. The study helps to understand why decision-makers continue to chose the same option and moreover, how they can get stuck to a certain brand choice. Learning effects, complementarity effects and adaptive expectations effects proof to be crucial drivers of consumer path dependence. It shows at the same time if consumers with certain personality traits are more susceptible to become path dependent. Although in this experimental study, consumption decisions were chosen as research object, the underlying approach can be applied to any decision-making context and is therefore also transferable to decision-making processes outside a consumption context. Since previous research on path dependence has mainly applied qualitative case-study research and simulations, this paper makes a further contribution by establishing experimental research for research questions concerning path dependent processes.

REFERENCES

Antonelli, C. (1999). The Economics of Path-dependence in Industrial Organization. *International Journal of Industrial Organization*, 15, 643-675.

Arthur, W.B. (1989). Competing Technologies, Increasing Returns, and Lock-in by Historical Events. *Economic Journal*, 99, 116-131.

Arthur, W.B. (1994). *Increasing Returns and Path Dependency in the Economy*. Ann Arbor, University of Michigan Press.

Baron, R.M. & Kenny, D.A., (1986). The Moderator–Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.

Cialdini, R.B., Trost, M.R., & Newsom J.T. (1995). Preference for consistency: The Development of a Valid Measure and the Discovery of Surprising Behavioral Implications. *Journal of Personality and Social Psychology*, 69, 318-328.

David, P.A. (1985). Clio and the Economics of QWERTY. *The American Economic Review*, 75(2), 332-337.

David, P.A. (1986). Understanding the Economics of QWERTY: The Necessity of History, in: W. N. Parker (ed.): *Economic History and the Modern Economist*, Oxford: Blackwell, 30-49.

Eisenmann, T., Parker, G., & van Alstyne, M. W. (2006). Strategies for Two-sided Markets. *Harvard Business Review*, 84(10), 92–101.

Farrell, J. & Saloner, G., (1985). Standardization, compatibility, and innovation. *RAND Journal of Economics*, 16(1), 70-83.

Farris, P., Verbeke, W., Mdickson, P. & Van Nierop, E. (1998). Path Dependencies and the Long-term Effects of Routinized Marketing Decisions. *Marketing Letters*, 9 (3), 247-268.

Häubl, G. & Trifts, V. (2000). Consumer Decision Making in Online Shopping Environments: The Effects of Interactive Decision Adds. *Marketing Science*, 19(1), 4-21

Johnson, E., Bellman, S. & Lohse, G. (2003). Cognitive Lock-In and the Power Law of Practice. *Journal of Marketing*, 67 (2), 62-75.

Katz, M.L. & Shapiro, C., (1985). On the Licensing of Innovations. RAND Journal of Economics, 16(4), 504-520.

Koch, J., Eisend, M. & Petermann, A. (2009). Path Dependence in Decision-Making Processes: Exploring the Impact of Complexity under Increasing Returns. *Business Research,* 2 (1), 67-84.

Kulik, C. T., Bainbridge, H. T. J., & Cregan, C. (2008). Known by the company we keep: Stigma-by-association effects in the workplace. Academy of Management Review, 33(1): 216-230.

Leibenstein, H. (1950). Bandwagon, Snob, and Veblen Effects in the Theory of Consumer's Demand. *Quarterly Journal of Economics*, 64, 183-207.

Miller, D. & Friesen, P. (1984). *Organization. A quantum view.* Englewood Cliffs, NJ.

Murray, K.B. & Häubl, G. (2002). The Fiction of No Friction: A User Skills Approach to Cognitive Lock-In. *Advances in Consumer Research*, 29 (1), 11-18.

Murray, K.B. & Häubl, G. (2007). Explaining Cognitive Lock-In: The Role of Skill-Based Habits of Use in Consumer Choice. *Journal of Consumer Research*, 34 (June), 77-88.

Pierson, P. (2000). Increasing Returns, Path Dependence, and the Study of Politics. *American Political Science Review*, 94, 251-267.

Schreyögg, G., Sydow, J. & Koch, J. (2003). Organisatorische Pfade – Von der Pfadabhängigkeit zur Pfadkreation? In: Schreyögg, G. & Sydow, J. (Hrsg.). *Managementforschung 13*. Wiesbaden: Gabler, 257-294.

Stieglitz, N. & Heine, K. (2007). Innovations and the Role of Complementarities in a Strategic Theory of the Firm. *Strategic Management Journal*, 28 (1), 1-15.

Sobel, M.E., (1982). Asymptotic Confidence Intervals for Indirect Effects in Structural Equation Models. *Sociological Methodology*, 13, 290-312.

Sydow, J., Schreyögg, G. & Koch, J. (2009). Organizational Path Dependence: Opening the Black Box. *Academy of Management Review*, 34 (4), 689-709.

Tellis, G. J., Yin, E., & Niraj, R. (2009). Does Quality Win? Network Effects Versus Quality in High-Tech Markets. *Journal of Marketing Research*, 46(2), 135–149.

Vergne, J.P. & Durand, R. (2010). The Missing Link Between the Theory and Empirics of Path Dependence: Conceptual Clarification, Testability Issue, and Methodological Implications. *Journal of Management Studies,* 47 (4), 736-759.

Zauberman, G. (2003). The Intertemporal Dynamics of Consumer Lock-In. *Journal of Consumer Research*, 30 (4), 405-419.