Abstract

The internationalization of a company is a complex endeavor. However, because of the special characteristics of the software industry, the internationalization of a software company can be particularly critical to its success. This study is among the first to employ institutional theory to analyze a software company’s degree of internationalization. An analysis based on the survey of 306 German software companies shows that both managers' perception of the domestic market as a “comfort zone” and debt investors’ pressures have a significant impact on the companies’ internationalization behavior. Besides, when they perceive the domestic market as unattractive, software companies that have other German IT companies as a role model internationalize to a lesser degree than companies without German role models. The study’s findings therefore point to successful strategies for policy-makers and managers alike that aspire to foster the internationalization of software companies.

Keywords: Institutional theory, internationalization, role models, software industry
**Introduction**

A company's internationalization presents a complex and dynamic endeavor (Bell 1995). Although the topic of internationalization has been analyzed under the assumption that rational decision-makers act upon perfect information being available, other models of internationalization make more realistic assumptions regarding how organizations address the challenge of internationalization. These models emphasize that companies go through a stage-wise learning process (Andersson 2000), entering foreign markets step-by-step. Both types of models have been challenged by the recent notion of “born globals,” companies that are “engaging in international operations from the first day of their establishment” (Sharma and Blomstermo 2003, p. 739).

However, these different views to analyze a company's internationalization behavior have in common that they either neglect or do not pay sufficient attention to the institutional environment that a company is embedded in. The focus of the analysis either centers on factors inherent to the company that intends to internationalize their business or emphasizes aspects related to the environment of the company’s potential international target market. All in all, there is a lack of studies that take into account the institutional environment in a company’s home market that the company is exposed to.

Analyzing the factors that foster or impede an organization’s internationalization is especially relevant and critical in the software industry. Many segments of the software market are characterized by strong network effects, which increase the benefits that a user can extract from a piece of software depending on how many other users employ the respective software (Briscoe et al. 2006; Buxmann et al. 2013). Therefore, the higher the number of users a software company can attract on an international basis, the higher the benefits of its software. These network effects can explain why many software segments are “winner-take-all” markets (Shapiro and Varian 1999).

This study will draw on institutional theory (Scott 2008) to explain companies’ degree of internationalization in the software industry, using the Germany software industry as an example. The German market is interesting in that software is acknowledged to be a major driver of the innovativeness of many German industries (Federal Ministry of Education and Research 2007). However, German software companies lack the degree of internationalization compared to other countries’ software companies, above all US-American ones (van Kooten 2011). By identifying institutional drivers and impediments to the internationalization of software companies, the study can guide policy-makers how to increase a country’s software companies’ degree of internationalization and assist managers with their companies’ internationalization efforts.

On a theoretical level, this study is among the first to analyze the impact of institutional influences on software companies’ degree of internationalization. In addition to applying the three pillars of institutional theory, this study will also add to institutional theory by further examining the potential interplay of institutional factors – an aspect which has to date received only scarce theoretical and empirical consideration. This study will provide evidence as to why in the absence of institutional clues arising from the normative pillar, companies will turn to clues provided by the cultural-cognitive pillar. In detail, this study plans to shed light on whether companies that perceive the German software market as not attractive (normative influence) and have other German companies as role models (mimetic influence) internationalize their business to a lesser degree than companies that do not model themselves on German role model companies.

In summary, this study will shed light on the following two research questions:

- **How do institutional influences affect (German) software companies’ degree of internationalization?**
- **How do mimetic and influences interact?**

This study is structured as follows: The first section has presented the introduction and motivation for this study. The second section will briefly provide some background information on the German software industry. Section three will present relevant aspects of institutional theory and the internationalization of companies. The fourth section develops the research hypotheses and integrates them into a research
model. Section five will provide the results of the statistical analysis. This study concludes with section six by pointing out management and policy implications as well as potential areas of future research.

The German Software Industry

Information and communication technologies (ICT) drive more than 80% of the innovations in some of Germany’s most important industries, such as the automotive, medical technology, and logistics sector (Federal Ministry of Education and Research 2007). However, both the international ICT market in general and the software market in particular are dominated mainly by non-German companies (van Kooten 2011). Only few German software companies, among them particularly SAP and Software AG, have managed to grow considerably and are considered to be among the world’s largest 50 software companies (PWC 2010; van Kooten 2011).

When German software companies manage to reach a certain size and expand internationally, these companies are usually so-called “hidden champions” (Simon 2009), operating in niches in the fields of business-to-business software and business-to-business services (Leimbach 2010). The fact that there are no internationally known German companies in recent consumer software markets like social networks (e.g. Facebook, LinkedIn), search engines (e.g. Google), content platforms (e.g. YouTube, Flickr), social news (e.g. Twitter), or consumer-to-consumer auctions (e.g. eBay) also fits this trend.

The tendency of a nation’s companies not to expand internationally can have severe negative consequences, as they might miss out on growth opportunities and market leadership. This is especially true in the software industry: The software market is characterized by network effects\(^1\) (Buxmann et al. 2013) which, together with the phenomenon of high first-copy cost (Cusumano 2004), often contribute to the emergence of a “winner-take-all market” (Shapiro and Varian 1999, p. 177). Hence, it can be argued that internationalization can be a strategic imperative for many software companies that do not want to be swept away by their international competitors.

Theoretical Background

This section will first briefly summarize the different views that have been taken to analyze the internationalization of companies in the literature. Subsequently, relevant details on institutional theory will be presented and how institutional theory has been applied to the internationalization of companies. The section will conclude by pointing out the research gaps that this study addresses.

The Internationalization of Companies

The internationalization of companies has been viewed broadly through two lenses: The economic and the process view (Benito and Gripsrud 1992). The economic view considers the decision of which country to enter at a time as a discrete phenomenon, which is taken weighing costs and benefits (Benito and Gripsrud 1992). The process view, on the other hand, replaces the notion of the economic decision-maker with one of behavioral man (Andersson 2000). In this perspective, the internationalization behavior of companies is seen as a stage-wise learning process. Companies add to their knowledge and leverage the experience gained in one market to subsequently enter new markets, which are increasingly more (culturally) distant. They also successively increase their engagement in specific markets, typically from occasional exports to fully-owned subsidiaries (Benito and Gripsrud 1992).

A rather recent focus of internationalization research has been put on so-called “born globals”, which have been defined as “small, technology-oriented companies that operate in international markets from the earliest days of their establishment” (Knight and Cavusgil 1996, p. 11), or more generally as companies that are “engaging in international operations from the first day of their establishment” (Sharma and Blomstermo 2003, p. 739). Born globals are a challenge to current internationalization theories, which are not able to explain the behavior of companies that quickly address many foreign markets at a time (Chetty

---

\(^1\) Network effects, or network externalities, are defined as “(...) the utility that a given user derives from the good depends upon the number of other users who are in the same ‘network’” (Katz and Shapiro 1985, p. 424).
and Campbell-Hunt 2004). Recently, knowledge- and network-based models have been put forward to understand the internationalization behavior of born globals (Sharma and Blomstermo 2003).

However, all of the approaches outlined above in regards to the internationalization of software companies do not pay attention to the fact that organizations are embedded in institutional and organizational fields (Meyer 2008). In these, institutional theory claims, it is not the pursuit of efficiency but the result of institutional influences that drives an organization’s decisions (Meyer and Rowan 1977). I will focus on these institutional factors in the following subsection.

**Institutional Influences**

Research shows that many decisions that are made in a company cannot be explained by purely rational actions of managers (Mignerat and Rivard 2009). Rather, one has to take into account that organizations are embedded in a “socially constructed environment” (Boxenbaum and Jonsson 2008, p. 80) which influences managers and the decisions they make on behalf of the company. However, this does not mean that managers act irrationally. Rather, “widespread social understandings (rationalized myths) (...) define what it means to be rational” (Greenwood et al. 2008, p. 3).

Institutional theory offers a lense to analyze these widespread social understandings. In their seminal paper, DiMaggio and Powell (1983) describe three kinds of pressure - mimetic, normative, and coercive - that have an impact on organizations. These mechanisms have become central to the three pillars of institutional theory, which Scott (2008) terms cultural-cognitive, normative, and regulative. Mimetic pressures stem from the taken-for-grantedness of certain aspects of social life: To reduce uncertainty and avoid confusion, organizations imitate successful peers (Boxenbaum and Jonsson 2008; Scott 2008). Normative pressures determine the actions that are considered “the right thing to do” (Suchman 1995, p. 579) and are based on expectations (Scott 2008). Coercive pressures result from regulative rules, power relationships, or politics; they can also arise from resource dependence (Boxenbaum and Jonsson 2008; Scott 2008).

Institutional theory has been drawn on to explain organizations’ (dis-)adoption and the diffusion of certain phenomena in the study of organizations. These phenomena can be broadly categorized into the following classes:

- Management concepts such as total quality management (Kennedy and Fiss 2009) or business process reengineering (Boudreau and Robey 1996)
- Technologies such as electronic data interchange (Teo et al. 2003) or computed tomography scanners (Barley 1986)
- Organizational structures such as the multidivisional form (Palmer et al. 1993) or the deinstitutionalization of the conglomerate firm (Davis et al. 1994)
- Anti-takeover strategies such as the board of directors’ poison pills (Davis 1991; Davis and Greve 1997) or golden parachutes (Davis and Greve 1997)
- Public sector reforms such as the civil service reform (Tolbert and Zucker 1983) or performance measurement and management (Brignall and Modell 2000)
- Challenges in international management such as the use of work practices across borders of multinational corporations (MNCs) or entry mode decisions of MNCs (Kostova et al. 2008)

The internationalization of a company is a series of complex decisions, involving many factors such as which countries to enter, the timing and sequence of entering different markets, and which entry modes to employ (Kutschker and Schmid 2010). As well, for many of the aspects that need to be taken into consideration, data might not be available to judge the situation definitely. Under decisions that involve complexity (Payne 1976) and uncertainty (Tversky and Kahneman 1974), people employ heuristics to cope with the situation at hand. Institutions can be perceived as such a heuristic to cope with the uncertainty.

---

2 This categorization does neither claim to be mutually exclusive nor does it strive to be all-encompassing. It is simply meant to structure the examples given and to emphasize that institutional theory has been drawn on to analyze many different facets of organizational life.
and complexity involved in the internationalization of a company, as it provides the mental shortcuts (Bruton et al. 2010) not having to ponder the rational details of every decision.

In the study of institutional pressures, certain conditions have been identified that influence the strength of institutional pressures. Among them are that late adopters are more susceptible to institutional influences than early adopters (Tolbert and Zucker 1983), that institutional influences that are being transmitted through direct ties are more influential than the observation of such influences (Davis 1991), and that the characteristics of CEOs (such as “finance CEOs”; Fiss 2008) influence how they behave in the face of institutional influences.

However, institutional pressures have in the extant literature been conceptualized as operating relatively independently from each other, i.e. they do not interact with each other. As stated in the previous paragraph, certain conditions have been identified that increase or decrease a certain kind of influence’s impact on an organization and its members. However, these conditions relate to factors other than different institutional pressures.

There is only one empirical study that applies Scott’s (2008) institutional pillars to the internationalization of companies. Cheng and Yu (2008) use institutional theory to analyze the timing and the entry mode of Taiwanese small- and medium-sized enterprises. However, their study does not (i) address whether institutional influences impact the degree of internationalization, (ii) focus on software companies, an area where a company’s internationalization is especially important, and (iii) pay attention to the possible interplay of different institutional influences. This study will attempt to address these research gaps.

**Hypotheses and Model Development**

A common topic in institutional research is that organizations with high status, high centrality or with many ties to other organizations “serve as models for others to copy” (Greenwood et al. 2008, p. 15). Role model companies therefore provide cognitive models that other companies can draw on (D’Aunno et al. 2000) to determine what represents a “proper course of action” (Boxenbaum and Jonsson 2008, p. 80). Role models can be understood as “templates” or “archetypes” which indicate the “appropriate, right, and the proper way of doing things” (Greenwood and Hinings, 1996, p. 1027). In the context of this study, this also includes, but is not restricted to, the “personal legitimacy” (Suchman 1995) of managers of role model organizations, which is based on the charisma of organizational leaders of a company that serves as a role model. Modeling one’s company on a successful role model is likely to reduce the uncertainty (Scott 2008) regarding which actions to take when faced with complex strategic decisions.

As outlined above, there is a lack of German software companies with a high degree of internationalization. Hence, when software companies model themselves on other software companies, or IT companies in more general terms, that they perceive as successful, there is a high probability that these role models do not have a high degree of internationalization. As the cognitive template that the role model organization provides is taken-for-granted (Scott 2008), there will be no need to question whether a low degree of internationalization is objectively the best strategic option to pursue. In her experiment that contributed to laying the foundation for the cultural-cognitive pillar of institutional theory, Zucker (1977) has impressively shown that mimetic pressures overrule objective facts, with the tendency of institutionalized perceptions to remain relatively stable. In contrast, German software companies that do not model themselves on German IT companies can be expected to have a higher degree of internationalization. I therefore propose:

\[ H_1: \text{Mimetic pressures in the form of modeling a company on other German IT companies have a negative impact on a German software company's degree of internationalization.} \]

Research suggests that there is a U-shaped relationship between domestic market size and the degree of internationalization of a company (Li and Yue 2008): Companies in very small and very large domestic markets tend to have a larger share of international revenue than companies in medium-sized domestic markets. German software companies might find themselves in such a situation with a domestic market of medium size, which offers seemingly little incentives to internationalize to a larger degree. Therefore, the belief is likely to have institutionalized among German software companies that it is the “right” action to
pursue not to step out of the “comfort zone” of the domestic market (Hoerndlein et al. 2012). This institutionalized perception that the German software market is attractive enough not having to internationalize (any further), can be expected to have a strong influence on German software companies, regardless of objective market attractiveness measures, such as revenue per employee. Therefore, I propose the following hypothesis:

\[ H_2: \text{Normative pressures in the form of the perception that the domestic market is attractive enough have a negative impact on a software company’s degree of internationalization, even when controlling for objective measures of market attractiveness.} \]

There is a lack of studies that analyze the interplay of different institutional influences, and this study is among the first ones to consider the potential interaction between normative and mimetic pressures. Research emphasizes that “under conditions of uncertainty organizations often imitate peers that are perceived to be successful or influential” (Boxenbaum and Jonsson 2008, p. 80). From this follows that under certainty, organizations are less likely to be influenced by role models, as they themselves know what course of action to take.

When companies perceive their home market as being unattractive, this can be assumed to cause uncertainty on how to behave, regarding the company’s strategic course in general and to what degree to internationalize the business in particular. In this circumstance, companies will model their internationalization strategy on companies they perceive as role models. As German software companies are only internationalized to a limited degree, companies following a German role model will result in the followers showing a lower degree of internationalization. On the other hand, companies that perceive the domestic market as not being attractive and do not have German role models are more likely to have a higher degree of internationalization. Thus, I propose:

\[ H_3: \text{Normative and mimetic pressures interact in the following way: Companies that perceive their domestic market as not being attractive and have German role models will show a lower degree of internationalization than companies that perceive their domestic home market as not being attractive and have no German role models.} \]

Research has shown that investors can influence strategic decisions of companies such as their restructuring (Ahmadjian and Robbins 2005) or their shareholder value orientation (Fiss and Zajac 2004). This coercive pressure can be explained by the fact that companies are resource-dependent (Boxenbaum and Jonsson 2008) on these investors and therefore follow their suggestions or pressures. When investors demand a higher international activity of a software company, the company will likely have to meet this demand, regardless of whether the investor possesses an equity investment in the company or not. I therefore propose:

\[ H_4: \text{Coercive pressures in the form of investors’ demands to internationalize have a positive impact on a software company’s degree of internationalization.} \]

Compared to the rather implicit mimetic and normative pressures, coercive pressures are quite salient and more explicit. Not following investors’ coercive demands might translate directly into retributions or the withdrawal of (financial) resources. As a result, investors’ influences are likely to replace the more subtle mimetic pressures that companies will follow when they perceive the domestic market as unattractive. Instead of following a role model, companies will succumb to their investors’ demands, and the influence of role models on software companies’ managers who face uncertainty whether to internationalize or not will fade compared to stronger coercive influences. From this follows:

\[ H_5: \text{When controlling for coercive pressures, the interaction effect between mimetic and normative pressures proposed in } H_3 \text{ will become less salient.} \]

---

3 The coercive influence can be assumed to be stronger for equity investors, as they – depending on the stake that they hold in the company – can possibly affect strategic decisions directly. In this study, the focus will be on debt investors: If they are able to exert coercive pressures on the companies that they invest in, the influence can be assumed to be even stronger for equity investors.
Figure 1 summarizes the research model as well as the formulated hypotheses.

![Research Model Diagram]

In the next section, I will provide details on the research design, including data collection and measurement, to test the five hypotheses.

**Research Design, Data Collection, and Measurement**

Data was collected through a web-based survey for which managers of software and Embedded Systems companies were invited via e-mail to participate as key informants; the managers’ contact data was extracted from the Hoppenstedt database (www.hoppenstedt.de). The survey was online from September 19, 2011 through October 18, 2011. After about two weeks, an e-mail reminder was sent out. The variables were operationalized as follows:

- The dependent variable “share of international revenue” (degree of internationalization) was measured by asking respondents to indicate the percentage of their company’s revenue outside the domestic (German) market for the last business year. This corresponds to the operationalization of “international diversification” in Li and Yue (2008).

- The independent variable “German role models” was measured by asking participants to indicate on a 5-point Likert scale to what degree they agree with the following statement: “Other German IT companies are role models for us.”

- The independent variable “perceived domestic market attractiveness” was measured by asking participants from debt-capital financed companies to indicate on a 5-point Likert scale to what degree they agree with the following statement: “The German market is profitable enough for us not having to internationalize (any further).”

- The independent variable “Investors’ pressure” was measured by asking participants to indicate on a 5-point Likert scale to what degree they agree with the following statement: “Our most important investors are interested in our company’s internationalization.”

- In addition, the following independent control variables were included:
  - Age of the company: Calculated based on the company’s year of foundation
  - Company size: Measured as the total number of employees
Domestic revenue per employee: To avoid biasing the results by asking for profitability figures directly, respondents were asked for the revenue generated in the company’s last fiscal year. As most of the expenses in a software company are related to staff expenses (Buxmann et al. 2013), the domestic revenue was calculated and divided by the number of domestic employees. This figure serves as the proxy for the profitability of the domestic market.

Segments: Respondents had to indicate which of the following segments their company belongs to: Embedded Systems, system software (such as databases), application software (such as enterprise resource planning software), web-centric applications (such as online platforms), or other. Respondents could indicate that their company belongs to several segments.

Data Analysis and Results

The survey showed a response rate of about 11% and a retention rate of about 21%. Those datasets were excluded from further analysis that had more than 25% of missing values and where participants dropped out completing less than 80% of the pages of the questionnaire. This resulted in a cleansed dataset of 869 companies. Table 1 shows the distribution of the companies’ size and the average share of international revenue per category of company size. The categorization was based on the classification provided by the European Commission (http://ec.europa.eu/enterprise/policies/sme/).

<table>
<thead>
<tr>
<th>Employees</th>
<th>Companies [%]</th>
<th>Share of International Revenue [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 9</td>
<td>17.8</td>
<td>12.3</td>
</tr>
<tr>
<td>&gt;= 10 and &lt;= 49</td>
<td>53.3</td>
<td>13.0</td>
</tr>
<tr>
<td>&gt;= 50 and &lt;= 249</td>
<td>20.4</td>
<td>17.7</td>
</tr>
<tr>
<td>&gt;= 250</td>
<td>7.5</td>
<td>30.1</td>
</tr>
<tr>
<td>n/a</td>
<td>1.0</td>
<td>32.8</td>
</tr>
<tr>
<td>median: 24 employees</td>
<td>Ø 14.9</td>
<td></td>
</tr>
</tbody>
</table>

As Embedded Systems companies cannot directly be compared with “pure” software companies, they were excluded from further analysis. In addition, companies that were active only in consulting work but not engaged in developing or implementing/hosting software solutions were excluded. Also, companies that had missing or negative values for the independent variables “domestic revenue per employee” and “age of company” were excluded. This resulted in a reduced dataset of 306 companies. Table 2 shows the distribution of the companies’ size and the average share of international revenue per category of company size for the remaining dataset.

<table>
<thead>
<tr>
<th>Employees</th>
<th>Companies [%]</th>
<th>Share of International Revenue [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 9</td>
<td>16.3</td>
<td>15.5</td>
</tr>
<tr>
<td>&gt;= 10 and &lt;= 49</td>
<td>57.2</td>
<td>12.1</td>
</tr>
<tr>
<td>&gt;= 50 and &lt;= 249</td>
<td>19.0</td>
<td>16.7</td>
</tr>
<tr>
<td>&gt;= 250</td>
<td>7.5</td>
<td>24.5</td>
</tr>
<tr>
<td>median: 24 employees</td>
<td>Ø 14.5</td>
<td></td>
</tr>
</tbody>
</table>

The average degree of internationalization of the whole dataset (14.9%) is almost the same as the average of the reduced dataset (14.5%). The distribution of the company sizes is also similar across the two datasets.
Variables were entered into a 4-step hierarchical multiple linear regression. In the first step, the control variables company age, company size, and domestic revenue per employee were entered in the first step of the regression. Besides, dummy variables were created and entered into the regression to account for the possibility that the respective market segment that a software company operates in can explain its degree of internationalization. These segments are system software, application software, web-centered applications, and other. The results of the regression's first step can be found in Table 3 (as missing values were handled listwise, the number of valid cases will be the same for the first three regression steps).

### Table 3. Step 1 of the Multiple Linear Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Beta</th>
<th>P Value</th>
<th>95% Bootstrapped CI</th>
<th>Bootstrapped p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of company</td>
<td>0.227</td>
<td>0.179</td>
<td>0.002</td>
<td>0.060 ; 0.426</td>
<td>0.003</td>
</tr>
<tr>
<td>Size of company</td>
<td>0.001</td>
<td>0.087</td>
<td>0.122</td>
<td>-0.002 ; 0.013</td>
<td>0.132</td>
</tr>
<tr>
<td>Domestic revenue per employee</td>
<td>-21.866</td>
<td>-0.88</td>
<td>0.124</td>
<td>-82.288 ; 16.472</td>
<td>0.363</td>
</tr>
<tr>
<td>Segment system software (dummy)</td>
<td>1.031</td>
<td>0.023</td>
<td>0.682</td>
<td>1.004 ; 0.013</td>
<td>0.149</td>
</tr>
<tr>
<td>Segment application software (dummy)</td>
<td>-1.157</td>
<td>-0.024</td>
<td>0.685</td>
<td>-6.979 ; 4.306</td>
<td>0.109</td>
</tr>
<tr>
<td>Segment web-centered (dummy)</td>
<td>-8.351</td>
<td>-1.90</td>
<td>0.001</td>
<td>-13.055 ; -3.375</td>
<td>0.004</td>
</tr>
<tr>
<td>Segment other (dummy)</td>
<td>6.122</td>
<td>0.109</td>
<td>0.072</td>
<td>-1.032 ; 13.601</td>
<td>0.109</td>
</tr>
</tbody>
</table>

R²: 9.7%; adjusted R²: 7.5%; N=300; F=4.463, p=.000 at 7 df

As the distribution of the dependent variable “degree of internationalization” is highly skewed (high percentage of companies with no international business), bootstrapping was used to derive robust estimations for the parameters and significance levels. Table 3 also contains the 95% confidence interval (CI) that resulted from a bootstrapping procedure with 1,000 replications.

The baseline model explains 9.7% of the dependent variable’s variance (adjusted R²: 7.5%). Except for the variable “domestic revenue per employee”, both standard and bootstrapped p values turned out to be very similar, which underlines the results’ robustness.

In Step 2, the mean-centered predictors “perceived market attractiveness” and “German role models” were entered into the regression. Table 4 contains the regression parameters including the 95% confidence intervals of the bootstrapping procedure.

### Table 4. Step 2 of the Multiple Linear Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Beta</th>
<th>P Value</th>
<th>95% Bootstrapped CI</th>
<th>Bootstrapped p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of company</td>
<td>0.177</td>
<td>0.140</td>
<td>0.009</td>
<td>0.015 ; 0.373</td>
<td>0.027</td>
</tr>
<tr>
<td>Size of company</td>
<td>0.001</td>
<td>0.064</td>
<td>0.221</td>
<td>-0.003 ; 0.010</td>
<td>0.149</td>
</tr>
<tr>
<td>Domestic revenue per employee</td>
<td>-24.838</td>
<td>-0.098</td>
<td>0.065</td>
<td>-74.918 ; 7.748</td>
<td>0.224</td>
</tr>
<tr>
<td>Segment system software (dummy)</td>
<td>1.222</td>
<td>0.028</td>
<td>0.601</td>
<td>-3.543 ; 6.047</td>
<td>0.632</td>
</tr>
<tr>
<td>Segment application software (dummy)</td>
<td>-0.991</td>
<td>-0.021</td>
<td>0.709</td>
<td>-6.720 ; 4.243</td>
<td>0.726</td>
</tr>
<tr>
<td>Segment web-centered (dummy)</td>
<td>-6.907</td>
<td>-1.57</td>
<td>0.003</td>
<td>-11.257 ; -2.388</td>
<td>0.005</td>
</tr>
<tr>
<td>Segment other (dummy)</td>
<td>5.926</td>
<td>0.105</td>
<td>0.060</td>
<td>-7.070 ; 12.636</td>
<td>0.092</td>
</tr>
<tr>
<td>Perceived market attractiveness</td>
<td>-6.070</td>
<td>-0.346</td>
<td>0.000</td>
<td>-7.839 ; -4.090</td>
<td>0.001</td>
</tr>
<tr>
<td>German role models</td>
<td>-1.926</td>
<td>-0.092</td>
<td>0.082</td>
<td>-3.966 ; 0.086</td>
<td>0.072</td>
</tr>
</tbody>
</table>

R²: 22.9%; adjusted R²: 20.6%; N=300; Δ F=24.995, p=.000 at 2 df
As can be seen in Table 4, perceived market attractiveness has a significant negative impact on the degree of internationalization, even when accounting for the effect of domestic revenue per employee. H1 can therefore be accepted.

The variable “German role models” has a negative impact on the degree of internationalization. However, although the variable is significant at p<.1, it fails to be significant at p<.05. H2 therefore has to be rejected.

In Step 3, the multiplication term “Perceived market attractiveness x German role models” was entered into the regression. Table 5 contains the regression parameters including the 95% confidence intervals of the bootstrapping procedure.

Table 5. Step 3 of the Multiple Linear Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Beta</th>
<th>p Value</th>
<th>95% Bootstrapped CI</th>
<th>Bootstrapped p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of company</td>
<td>.179</td>
<td>.141</td>
<td>.007</td>
<td>0.15 ; 3.368</td>
<td>.024</td>
</tr>
<tr>
<td>Size of company</td>
<td>.001</td>
<td>.068</td>
<td>.188</td>
<td>-.003 ; .010</td>
<td>.128</td>
</tr>
<tr>
<td>Domestic revenue per employee</td>
<td>-27.004</td>
<td>-1.09</td>
<td>.039</td>
<td>-75.648 ; 4.495</td>
<td>.160</td>
</tr>
<tr>
<td>Segment system software (dummy)</td>
<td>.617</td>
<td>.014</td>
<td>.790</td>
<td>-4.184 ; 5.572</td>
<td>.794</td>
</tr>
<tr>
<td>Segment application software (dummy)</td>
<td>-1.320</td>
<td>-.028</td>
<td>.615</td>
<td>-7.011 ; 4.357</td>
<td>.655</td>
</tr>
<tr>
<td>Segment web-centered (dummy)</td>
<td>-6.934</td>
<td>-.158</td>
<td>.003</td>
<td>-11.154 ; -2.423</td>
<td>.005</td>
</tr>
<tr>
<td>Segment other (dummy)</td>
<td>5.182</td>
<td>.092</td>
<td>.096</td>
<td>-1.062 ; 12.029</td>
<td>.129</td>
</tr>
<tr>
<td>Perceived market attractiveness</td>
<td>-5.793</td>
<td>-.330</td>
<td>.000</td>
<td>-7.499 ; -3.903</td>
<td>.001</td>
</tr>
<tr>
<td>German role models</td>
<td>-2.033</td>
<td>-.097</td>
<td>.063</td>
<td>-4.015 ; .048</td>
<td>.053</td>
</tr>
<tr>
<td>Perceived market attractiveness x German role models</td>
<td>2.500</td>
<td>.152</td>
<td>.004</td>
<td>.803 ; 4.342</td>
<td>.005</td>
</tr>
</tbody>
</table>

R²: 25.2%; adjusted R²: 22.6%; N=300; ∆ F=8.665, p=.004 at 1 df

As can be seen from the p values of the interaction term in the Table 5, there is a significant interaction between “perceived market attractiveness” and “German role models”.

Figure 2 shows the interaction effect graphically by plotting the median values of the share of international revenue for the groups “high role model” (dashed line; scale values 4 and 5) and “low role model” (solid line; scale values 1 and 2) for low (scale values 1 and 2) and high (scale values 4 and 5) perceived market attractiveness. For both the low and high role model group, the share of international revenue is quite low, with median values at 0% and 3.5% respectively. However, the difference becomes quite large when looking at the cases for low perceived market attractiveness; the share of international revenue jumps to 32.8% for the low role model group, whereas it only increases to 10.0% for the high role model group.4

---

4 This result holds when using total revenue per employee instead of domestic domestic revenue per employee. Both variables are correlated with a coefficient of .861 (p = .000).

5 The graphical results are very similar if the mean values instead of the median values are plotted (4.7% and 8.5% vs. 36.0% and 13.7%).
Both the regression and the graphical analysis confirm the proposed interaction effect. $H_3$ can therefore be accepted.

In Step 4, the variable “investors’ pressure” was entered into the regression\(^6\). Table 6 contains the regression parameters including the 95% confidence intervals of the bootstrapping procedure.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>Beta</th>
<th>$P$ Value</th>
<th>95% Bootstrapped CI</th>
<th>Bootstrapped $p$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of company</td>
<td>.237</td>
<td>.198</td>
<td>.029</td>
<td>-1.09 ; .497</td>
<td>.071</td>
</tr>
<tr>
<td>Size of company</td>
<td>.002</td>
<td>.055</td>
<td>.569</td>
<td>.017 ; .022</td>
<td>.733</td>
</tr>
<tr>
<td>Domestic revenue per employee</td>
<td>-.541</td>
<td>-.191</td>
<td>.033</td>
<td>-1.495 ; 2.113</td>
<td>.157</td>
</tr>
<tr>
<td>Segment system software (dummy)</td>
<td>.905</td>
<td>.018</td>
<td>.836</td>
<td>-7.644 ; 10.325</td>
<td>.853</td>
</tr>
<tr>
<td>Segment application software (dummy)</td>
<td>-.639</td>
<td>-.068</td>
<td>.454</td>
<td>-1.136 ; 5.798</td>
<td>.445</td>
</tr>
<tr>
<td>Segment web-centered (dummy)</td>
<td>-.457</td>
<td>-.092</td>
<td>.294</td>
<td>-12.496 ; 4.123</td>
<td>.279</td>
</tr>
<tr>
<td>Segment other (dummy)</td>
<td>11.632</td>
<td>.173</td>
<td>.063</td>
<td>-4.293 ; 27.683</td>
<td>.151</td>
</tr>
<tr>
<td>Perceived market attractiveness</td>
<td>-6.700</td>
<td>-.292</td>
<td>.002</td>
<td>-10.608 ; -2.958</td>
<td>.001</td>
</tr>
<tr>
<td>German role models</td>
<td>-3.936</td>
<td>-.165</td>
<td>.056</td>
<td>-7.611 ; .309</td>
<td>.063</td>
</tr>
<tr>
<td>Perceived market attractiveness x</td>
<td>2.913</td>
<td>.132</td>
<td>.122</td>
<td>-7.715 ; 6.588</td>
<td>.098</td>
</tr>
<tr>
<td>German role models</td>
<td>5.361</td>
<td>.265</td>
<td>.004</td>
<td>1.660 ; 9.097</td>
<td>.006</td>
</tr>
</tbody>
</table>

$R^2$: 39.1%; adjusted $R^2$: 31.7%; N=103; $\Delta F=8.884$, $p=.004$ at 1 df

---

\(^6\) Please note that step 4 reduces the number of valid cases by around 2/3, as only about 1/3 of the companies indicated that they are financed by debt capital. Therefore, the results for step 4 were calculated separately, and $\Delta F$ was calculated based on the difference to the $F$-value in the third regression step with N=103.
As can be seen in Table 6, investors’ pressure has a significant positive impact on the degree of internationalization. \( H_4 \) can therefore be accepted. Besides, the interaction term “Perceived market attractiveness x German role models” becomes non-significant. \( H_5 \) can therefore be accepted.

To check for multicollinearity among the independent variables, variance inflation factor (VIFs) were calculated for step 3 and 4 of the regression. With maximum VIFs of 1.2 for step 3 and 1.4 for step 4, multicollinearity does not imperil the validity of this study’s results.

### Additional Robustness Check

To check for robustness of the results, a binary logistic regression was conducted. The cut-off value for determining the binary dependent variable was set to a degree of internationalization of 5%, as this resulted in groups of almost the same size (step 3: 169 companies not internationalized, 131 companies internationalized; step 4: 55 companies not internationalized, 48 companies internationalized). Results for the relevant variables’ (bootstrapped) p values of the binary logistic regression can be found in Table 7 for step 3 and in Table 8 for step 4.

#### Table 7. Step 3 of the Binary Logistic Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>p Value</th>
<th>Bootstrap p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived market attractiveness</td>
<td>-.562</td>
<td>.000</td>
<td>.001</td>
</tr>
<tr>
<td>German role models</td>
<td>-.029</td>
<td>.817</td>
<td>.831</td>
</tr>
<tr>
<td>Perceived market attractiveness x German role models</td>
<td>.255</td>
<td>.019</td>
<td>.031</td>
</tr>
</tbody>
</table>

Nagelkerke’s \( R^2 \): 22.8%; correct classification: 70.7%

#### Table 8. Step 4 of the Binary Logistic Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>p Value</th>
<th>Bootstrap p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived market attractiveness</td>
<td>-.542</td>
<td>.024</td>
<td>.038</td>
</tr>
<tr>
<td>German role models</td>
<td>-.013</td>
<td>.955</td>
<td>.947</td>
</tr>
<tr>
<td>Perceived market attractiveness x German role models</td>
<td>.293</td>
<td>.104</td>
<td>.227</td>
</tr>
<tr>
<td>Investors’ pressure</td>
<td>.699</td>
<td>.002</td>
<td>.002</td>
</tr>
</tbody>
</table>

Nagelkerke’s \( R^2 \): 37.4%; correct classification: 79.6%

The results of the binary logistic regression confirm the results of the multiple linear regression; the hypotheses are accepted/rejected consistent with the results of the linear regression. The results can therefore be assumed to be stable and not dependent on the specific method of analysis.

### Common Method Variance

Common Method Variance (CMV) is “variance that is attributable to the measurement method rather than to the constructs the measures represent” (Podsakoff et al. 2003, p. 879). It is likely to be most problematic in studies in which “the data for both the predictor and criterion variable are obtained from the same person in the same measurement context using the same item context and similar item characteristics” (Podsakoff et al. 2003, p. 885). Although some of these characteristics apply to this study, CMV is unlikely to pose a substantial threat to the findings for the following reasons.

First, while some of the independent variables were measured on a 5-point Likert scale, independent variables such as revenue, year of foundation (based on which the companies’ age was calculated), the number of employees as well as the dependent variable were measured with free-entry text fields. Besides,
the dummy variables were derived from selected checkbox values. Second, CMV can be expected to pose less of a problem for moderation analysis (Dong et al. 2009; Levin and Cross 2004), as “if common method variance is substantial, it should be present regardless of the level of the moderator. Then, it is difficult to explain why the independent and dependent variables are more or less strongly related depending on the level of the moderator” (Dong et al. 2009, p. 28.). Third, despite its limitations, a Harman's single-factor test (Podsakoff et al. 2003) was performed. A five-factor solution emerged for the variables used in regression steps 3 and 4, with the first factor accounting for 15.8% respectively 17.3% of the variables’ variance. This result indicates that a strong impact of CMV is at least very unlikely.

Implications, Limitations, and Future Research

In summary, the study’s findings indicate that institutional pressures can explain a substantial part of the variance of software companies’ degree of internationalization, measured as the share of international revenue.

Regarding normative pressures, software companies resort to the “comfort zone” of their domestic market, as they perceive the domestic market attractive enough not to have to internationalize at all or any further, apparently independent from the “objective” profitability of the domestic market, measured as the domestic revenue per employee.

On the other hand, mimetic influences in the form of role model companies did not turn out to have a significant direct negative effect on software companies’ degree of internationalization. However, normative and mimetic pressures interact: Companies that perceive the domestic market as not attractive enough and have no German IT companies as a role model internationalize to a higher degree than companies that have a German IT company as a role model.

Coercive pressures in the form of investors’ pressure to internationalize also turned out to have a significant impact on a company’s degree of internationalization. In the face of these coercive pressures, the interaction effect of normative and mimetic pressures becomes non-significant.

The findings have some important implications, both for managers of software companies and for countries’ policy makers. Managers of software companies that focus on their domestic market might want to ask themselves whether their decision not to internationalize is based on their subjective perception of the attractiveness of their domestic market, which could possibly hurt their company in the long run. Therefore, managers should critically reflect on their own perception of the domestic market attractiveness and compare it with objective market data, such as domestic market growth rates, profit margins, or competitive threats through international companies. This introspection could help them to avoid making the wrong long-term strategic decisions. Moreover, managers should reflect on the role models they have and if their role models’ behavior might be a reason why they hesitate to internationalize their business. Besides, managers might opt to select investors that are known for insisting that companies internationalize, as investors’ pressures have a positive influence on a company’s share of international revenue.

For countries that want to promote their software industry’s international expansion, this has important policy implications which might appear paradoxical at first sight: By stressing that the domestic market is not as profitable in the long run as it might seem, politicians could possibly nudge software companies to step out of their “comfort zone” and expand internationally. Moreover, countries could highlight the international achievements of selected national companies, thereby creating role models which show a high degree of internationalization.

There are some potential limitations that might have impacted the generalizability of the study’s findings. First, some of the findings could be specific to the German software industry and might result from certain cultural, economic or political conditions that are specific to Germany. Therefore, the study would have to be replicated in other countries.

In addition, future studies have to show whether the findings are specific to the software sector or also apply to other industries. As the mechanisms that I propose are grounded in institutional theory, the findings can possibly be transferred to other industry settings with conditions similar to the institutional context of this study.
Besides, to keep the questionnaire as short as possible in order to avoid fatigue among respondents and keep the time necessary to complete the survey to a minimum, the measurement instruments for the institutional pressures consisted of one single item each. Therefore, no validity and reliability measures could be calculated. However, in cases where the constructs focus on a concrete singular object and a concrete attribute, single-item measures can be used (Bergkvist and Rossiter 2007). In various discussions with other researchers and having received feedback from practitioners during the pre-test phase of the survey, the items were found clear and specific enough to measure the intended constructs. Besides, the bootstrapping procedure would have revealed if there had been problems regarding the reliability and validity of the measurement instrument: If different respondents had different aspects in mind when they answered an item (low validity) and/or the item didn’t measure a construct very well (low reliability), this would have resulted in large confidence intervals and consequently high p values in the bootstrapping procedure. However, I encourage researchers to develop multi-item measures and replicate the study to assess whether the single-item measures in this study could have possibly affected the results.

Moreover, statistical power analysis (Faul et al. 2009) shows that although the tests for significance conducted regarding the multiple linear regression are powerful enough to detect medium effects, a larger sample would be required to detect small effects. Therefore, I cannot state with certainty whether the interaction effect becoming non-significant in step 4 of the regression is due to the reasons that I suggest or because of the lack of statistical power. Future studies should therefore analyze this interaction effect with a larger sample and sufficient statistical power to detect small effects.

Future research could pay closer attention to software companies’ top management teams and how they affect the susceptibility to the institutional pressures identified. Mindful (Swanson and Ramiller 2004) managers might be less prone to apply institutional heuristics and rather focus on objective factors such as the profitability of the domestic market. Future research could also make a connection between software managers’ propensity to take risks and how this affects their response to institutional pressures. Besides, the analysis of institutional belief systems, such as that a rapid and extensive expansion is necessary for a software company’s survival or the availability of highly internationalized role models, could help to explain the internationalization behavior of born globals.

In summary, this study sheds light on the interdependencies of institutional pressures. This study could be the starting point for more research on how institutional influences interact and under which conditions certain affects apply or cease to have any affect. Besides, this study brings a fresh perspective on the analysis of the internationalization behavior of companies. Instead of focusing on purely rational factors, future research could pay more attention to the institutional influences that shape an industry’s internationalization behavior.
References


