The economic consequences of ISO 9000 Certification in East and West German firms in the mechanical engineering industry*

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A central argument of new institutionalism is that organizational success depends not only on efficient coordination and control of productive activities, but on conforming to institutionalized expectations. There is a dearth of empirical studies which analyze the effects of the adoption of institutionalized elements. In our study, we examine the effect of ISO 9000 certification on resource inflow of German mechanical engineering firms. Our findings suggest that organizations are actually rewarded for complying with institutionalized expectations and implementing ISO 9000 standards. Our findings also show that the readiness to comply with institutionalized norms led to different economic consequences in East and West Germany.

Ein Kernargument der neoinstitutionalistischen Organisationstheorie besagt, dass der Erfolg einer Organisation nicht nur von der effektiven Steuerung der Arbeitsaktivitäten abhängt, sondern auch von der Organisation institutionalisierten Erwartungen genügt. Nur wenige Studien liegen bislang vor, in denen die Auswirkungen der Übernahme institutionalisierter Strukturelemente untersucht wurden. In der vorliegenden Arbeit analysieren wir die Auswirkungen einer ISO 9000-Zertifizierung auf den Ressourcenzufluss von Unternehmen in der deutschen Maschinenbauindustrie. Unsere Befunde zeigen, dass Organisationen, die den institutionalisierten Erwartungen entsprechen und ein Qualitätsmanagementsystem gemäß der ISO 9000er Normen übernehmen, belohnt werden. Unsere Befunde zeigen auch, dass die Bereitschaft, sich institutionalisierten Erwartungen zu fügen, unterschiedliche Auswirkungen bei ost- und westdeutschen Unternehmen hat.

Key words: East Germany, ISO 9000, Institutional Theory, Performance.

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Introduction

A central argument of new institutionalism in organization theory is that organizational success depends not only on the efficient coordination and control of productive activities, but also on organizations conforming to institutionalized expectations in order to gain legitimacy and the resources they need for survival (Meyer/Rowan 1977; DiMaggio/Powell 1983; Tolbert/Zucker 1996; Oliver 1997; Karhunen 2008). Despite the centrality of this proposition, there is a dearth of empirical studies which research the effects of the adoption of institutionalized elements on the inflow of resources. Most of the studies within the tradition of new institutionalism focus on the diffusion and adoption of institutionalized structural elements and management practices (Scott 2008). Only a few studies shed light on the effect of the adoption of institutionalized structural elements on organizational performance. Some studies analyze the survival chances of hospitals and other public service organizations after having obtained accreditation (Singh et al. 1986/1991; Zucker 1987; Ruef/Scott 1998). Others examine the effect of the adoption of institutionalized elements on share prices (Westphal/Zajac 1998), corporate reputation and financial performance (Staw/Epstein 2000). Most of the studies find that the adoption of institutionalized practices has a positive effect on organizational performance. However, with very few exceptions (Staw/Epstein 2000), the anticipated effects on the inflow of resources has not been directly tested. Staw and Epstein (2000) measured the effects on a company's economic performance, recording financial data on return on assets, return on equity, and return on sales.

However, it has not been investigated whether the institutional context affects the consequences of a company's adaption to institutionalized expectations. In our study, we examine the effect of ISO 9000 certification on resource inflow of East and West German mechanical engineering firms. In the 1990s, West Germany represented a well-established market economy, while East Germany, i.e. the former GDR, was transformed from a socialist regime to a market economy.

In the mid-1990s, ISO 9000 certification was already an institutionalized practice all over the world (Guler et al. 2002; Boiral 2003). Thus, ISO 9000 certification should in general increase the legitimacy of a firm, and certified firms should be more successful in gaining the resources they need to survive than firms which are not certified. We argue, however, that the economic consequences of ISO 9000 adoption also depend on the institutional context in which a firm operates.

ISO 9000 – An institutionalized structural element

Since the late 1980s, "quality" has been hailed as an important, if not the "ultimate goal" of organizations (Malorny 1996). ISO 9000 standards for quality

systems have been promoted as rational means of increasing the performance of organizations and as a means of securing organizational survival.

Important promoters in Germany have been professional organizations, such as the associations of quality engineers, standardization bodies such as the International Organization for Standardization (ISO) and the German Standards Institute (DIN), consultants, the business press, business schools, and "government bodies" such as the European Commission (Walgenbach 2000; Walgenbach/Beck 2002). The business press has been awash with articles which predicted that firms without certification would lose their market share in the long run and claimed that ISO 9000 certification has become essential for firms exporting to certain countries, such as Britain, the USA, France, or the Netherlands. The spread of ISO 9000 certification was further intensified by the fact that the European Commission integrated ISO 9000 standards in its quality policy to increase the competitiveness of European enterprises and referred to the standards in a number of technical directives (Walgenbach 2000). The rapid diffusion of ISO 9000 certificates could also be attributed to the fact that organizations that have adopted quality management techniques are generally perceived to be more innovative and rated higher in terms of management (Staw/Epstein 2000). By adopting new quality management techniques, organizations appear to be in line with the perceptions of modern and rational organizations and thus increase their legitimacy. Numerous studies conducted in Germany show that German firms adopted the standards primarily because of the impact these standards were anticipated to have on the market rather than their technical benefits (Deiß 1994; Walgenbach 2000).

The ISO 9000 standards published in 1994 represent "distinct forms of quality system requirements suitable for the purpose of a supplier demonstrating its capability, and for the assessment of the capability of a supplier by external parties" (ISO 9001, 1994). They contain demands concerning the documentation of the quality management system and "specify requirements which determine what elements quality systems have to encompass" (ISO 9001, 1994). Initially, before ISO 9000 standards became a general international standard for quality systems, large, international mass-producing firms were seen as the key addressees of standardized quality systems (Zwieten 1972). However, over time, the pool of potential adopters of standardized quality systems has expanded to all kinds of organizations, even service companies.

Despite the growing popularity of ISO 9000 norms, the technical efficiency of these standards, i.e., their effect on organizational performance, has been questioned by a number of authors (Douglas et al. 2003) as well as by German industry and its associations since the first drafts of the standards (Walgenbach 2000). For example, it has been argued that the standards reduce the flexibility of organizations and lead to the standardization of the management of organizations. Moreover, it has been mentioned that organizations for which the

quality system standards were originally not developed, such as small organizations or organizations having customized production, might suffer from technical disadvantages stemming from the adoption of ISO 9000 standards. Furthermore, it has been criticized that the standards lead to an increase in the number of written rules and procedures, and thus to an increase in the degree of formalization (Beck/Walgenbach 2003). They therefore contradict the current dominant management ideology that organizations should dispense with formalized rules as much as possible (Peters 1992).

Hypotheses

In this study, we analyze the effect of ISO 9000 certification on resource inflow of German mechanical engineering firms. The intention of our study is to add a missing piece to the empirical body of knowledge based on institutional theory. A core argument in the conceptual foundations of institutional theory is that organizational success does not only depend on efficient coordination and control of productive activities, but that organizations also must conform to institutionalized expectations in order to gain legitimacy and the resources they need for survival (Meyer/Rowan 1977; DiMaggio/Powell 1983). However, empirical studies on the effects of the adoption of institutionalized structural elements on the inflow of resources are rare. In this paper, we investigate the effects of ISO 9000 certification on resource inflow, i.e. on sales. We further analyze whether these economic consequences vary between firms which differ in terms of their location, namely whether they are located in East or West Germany.

Customers are an important external claimant group for organizations. It is customers who primarily determine the survival prospects of an organization. As is indicated by the literature and confirmed by a number of empirical studies, an increasing number of organizations perceive ISO 9000 certification as a necessary prerequisite for maintaining customer relationships. For example, a study conducted by the National Confederation of the German Industry in Germany revealed that customers were an important driving force for the adoption of ISO 9000 standards (Bundesverband der Deutschen Industrie, 1992). The question as to whether customers expect ISO 9000 certification was answered with ‘yes’ or ‘partly yes’ by 70% of the respondents (Kamiske et al. 1994). We thus expect an ISO 9000 certification of a firm to satisfy the expectations of customers. This should positively affect the sales of an organization.

H1a: Firms that are ISO 9000 certified have higher sales than firms that are not ISO 9000 certified.

Moreover, one can expect that the positive effect of ISO 9000 certification on a firm’s success is even reinforced in a situation where firms otherwise suffer

from reputation problems. Firms based in an environment associated with low quality, which show their compliance with widely accepted quality standards, should have proportionately higher resource inflows than firms which are located in an environment of firms which are considered to produce high quality. If trust in the quality of a firm's product has already been established, ISO 9000 certification should result in a lesser amount of additional legitimacy and resource inflows than the certification of a firm for which this certification means a great shift in the trust of customers and other stakeholders.

After the fall of the Berlin Wall in 1989, East German manufacturing firms, i.e., former firms in the former GDR, were faced with this particular problem of the low quality reputation of their products. East German production had the image of being old and technically inferior. Therefore, we argue that East German firms should particularly benefit from ISO 9000 certification:

H1b: Firms located in East Germany benefit to a greater extent from ISO 9000 certification than West German firms.

According to Westphal and Zajac (1998), announcing the implementation of an institutionalized structural element is sufficient to enhance the reputation and standing of a firm. Even though a new practice might not have been implemented by the organization, the environment reacts positively to the mere declaration that it will do so. In a similar vein, we argue that even if an organization has not yet been ISO 9000 certified, application for certification – when it is perceived by customers and other stakeholders – should also enhance the resource inflow of an organization.

H2a: Firms that are in the process of obtaining ISO 9000 certification have higher sales than firms that are not ISO 9000 certified or are not in the process of obtaining ISO certification.

Again, East German firms should receive relatively higher returns than West German firms from the application for ISO 9000 certification, since East German firms face the problem of having a poor reputation regarding the quality of their products.

H2b: Firms located in East Germany that are in the process of obtaining ISO 9000 certification benefit to a greater extent from applying for ISO 9000 certification than do West German firms.

Data and methods

The organizational field in which we conducted our analyses was the German mechanical engineering industry. With a sales volume of 257.8 billion DM in 1999, it is the largest industry in Germany both in terms of number of companies (57,180 in 1999) and number of employees (927,000 in 1999). It is characterized by a high rate of innovation and small scale, special-purpose, and

customer-oriented production (Piore/Sabel 1984; Delmestri 2002). The mechanical engineering industry in Germany is dominated by small and medium-sized companies, which are often market leaders in their area of specialization. More than 80% of the companies have fewer than 200 employees, and only 2.2% have more than 1,000 employees (VDMA 2000).

The data set that we used is the NIFA (Neue Informationstechnologien und flexible Arbeitssysteme) Panel (Widmaier 2000). It was set up to examine the developments of the German mechanical engineering industry in the 1990s. The survey was primarily concerned with the usage of different technologies in the German mechanical engineering industry and the configurations of work organization according to these technologies. Since it was only reasonable to ask questions on these topics in organizations that were not too small, the target population of the NIFA panel was all German mechanical engineering firms with at least 20 employees. However, some firms in the sample had fewer than 20 employees. From 1991 to 1998, a member of top management in all of these firms (about 6,000) received a questionnaire on a yearly basis. With the exception of the first two waves, the response rate in each year was between 25% and 30%.

Dependent variables and model specification

In 1996, the firms were asked whether they were ISO 9000 certified or were currently applying for ISO 9000 certification. This question was asked in this panel wave only. The firms were asked in each wave how many organizational members were employed at the beginning of the year. Hence, by dividing yearly sales by the number of employees and taking the natural logarithm of this quantity, we were able to build a reasonable dependent variable which accounts for different firm sizes. However, in each wave, the firms were asked about the sales of the preceding year. Since we wanted to test the influence of ISO 9000 certification and application for certification on the returns – the sales per employee – of the organizations, we had to take the information on sales from the 1997 wave. This was done in order to rule out the possibility that sales were measured before the certification status was measured. Therefore, two panel waves had to be matched. Subsequently, the data set was reduced to 931 organizations. In 1996, 266 of them were already ISO 9000 certified, 373 organizations were applying for certification, and 292 organizations were neither certified nor did they plan to obtain certification.

Our analysis of the consequences of ISO 9000 certification has to come to grips with severe methodological problems, namely selection difficulties. First of all, ISO 9000 certification is costly. Moreover, in order to adapt to the certification requirements, organizations must increase the formalization of their procedures (perhaps they are even forced to change their procedures), and they must change at least some parts of their authority structure (Walgenbach 2001). Thus, it

might be the case that financially more successful firms are more likely to afford ISO 9000 certification. Moreover, more successful firms might also have better qualified employees who are more sensitive to outside developments – e.g., opportunities of public funding – and who are therefore more likely to recommend application for ISO 9000 certification. Therefore, a positive effect of ISO 9000 certification on sales might be the result of a reverse causal influence.

Since we only had access to cross sectional data, we initially intended to apply a non-parametric propensity score matching process (Heckman et al. 1999) to the analysis of sales. Unfortunately, propensity score matching requires that one is able to find – in our case – non-certified firms that resemble the certified ones in all dimensions except certification. This requirement could most likely be fulfilled if the group of non-certified firms were much larger than the group of certified firms. However, as the two groups consisted of about the same number of firms, we were not able to find non-certified matching partners for the certified firms which shared the same characteristics as the certified ones. In other words: we could not hold other relevant factors constant when comparing the sales of certified and non-certified firms in a matching procedure.

We therefore decided to use parametric methods in order to analyze the effects of ISO 9000 certification on sales. In order to correct for the selectivity of the data, we first created three sub-samples of the data.

Sub-sample 1: The first sub-sample consisted of organizations that were already ISO 9000 certified and organizations that were not certified and did not plan to obtain certification (N=558).

Sub-sample 2: The second sub-sample consisted of organizations that were already ISO 9000 certified and organizations that were currently applying for certification (N=639).

Sub-sample 3: The third sub-sample consisted of organizations that were currently applying for certification and organizations that were not certified and did not plan to obtain certification (N=665).

In a first step, we estimated the probability of ISO certification and/or application for such a certification for each sub-sample with a multivariate probit model. Using these selection equations, it was possible to estimate the individual probability of ISO certification or application for ISO certification for each organization.

We finally estimated linear regression models of sales for each sub-sample in order to estimate the effects of ISO certification or application for certification. In these regression models, we included the individual probabilities of certification or application for certification as an additional covariate. Since, as we have stated above, these probabilities should resemble the level of "success" of each organization, the selection problem should at least be attenuated when

these probabilities are controlled for in the models (Greve 1999). All models used a White correction for the estimation of standard errors in order to control for heteroscedasticity (White 1980).

Independent variables

ISO: In the first two sub-samples, the organizations that were ISO 9000 certified were coded with 1, the other organizations with 0. In the third sub-sample, all organizations that were currently applying for ISO 9000 certification were coded with 1, and all other organizations with 0.

P(ISO): In the first two sub-samples, the individual probability of ISO 9000 certification was taken as a covariate. In the third sub-sample, the individual probability of a current application for ISO 9000 certification was taken as a covariate.

East Germany: All firms located in East Germany, i.e., in the former GDR, were coded with 1, and all other firms were coded with 0. This variable accounts for the socialist legacy of strong bureaucracy and for the difficulties of East German firms had with market competition.[1]

In order to test the difference of the effect of ISO 9000 certification or application for certification, respectively, we built interactions between the ISO variables and the dummy variable for East Germany.

Control variables

The following variables were used as predictors in the selection equations and as control variables in the models on inflow of resources.

Proportion of customized and small-series production: The respondents were asked about the percentage of single-unit – i.e. totally customized – production as well as the extent of small-batch production as a proportion of all products or product groups. We added both variables in order to obtain a single proportion and divided this new variable by 100.

[1] The data did not provide any information that would have allowed us to distinguish between 'original' East German firms and subsidiaries of Western firms. However, since the information on the dependent variable, sales per employee, as well as all other information was collected at the individual organizational level, the influence of location should be present for all East German firms in the sample – no matter whether they have a Western parental organization or not. It is, nevertheless, possible that spillover effects exist for East German firms that have headquarters outside East Germany. Given that 74% of the East German firms in the sample are single unit firms, however, it is clear that for the great majority of East German firms a bias of the location effect – caused by a Western headquarters – is simply not possible.

Proportion of sales made with industrial customers: The firms were asked about the percentage of sales made with consumers and processors in industry. We added both proportions and divided this new variable by 100. We took the values of the 1996 wave (which measured sales in 1995) of this variable for the selection equations and the values of the 1997 wave for the equations for sales.

Proportion of sales made to public agencies: The firms were also asked about the percentage of sales made to public establishments. Again, we took the 1996 values of this variable for the selection equations and the values of the 1997 wave for the equations for sales. We also took the division of this variable by 100 as a covariate again.

We omitted the proportion of sales made to private consumers in order to prevent obtaining confounded models.

Organizational size: We used the number of employees as an indicator of size. The respondents were asked how many people were employed by the firm at the beginning of the year. We took the natural logarithm of this quantity. This variable accounts for the fact that larger organizations are scrutinized more strongly by the environment. Again, we took the values of the 1996 wave to construct this variable for the selection equations and the values of the 1997 wave to construct this variable for the sales equations. We did this because the dependent variable of the selection equations was measured in 1996 and the dependent variable of the success equations is the sales per employee was measured in 1997.

Proportion of administration staff: The respondents were asked how many people were employed in the administrative units at the beginning of the year. We calculated the ratio of employees in administration to total number of employees and used this ratio as an indicator of the potential of firms to register important developments in the environment of the focal organization. We also took the values of the 1996 wave to construct this variable for the selection equations and the values of the 1997 wave to construct this variable for the sales equations.

Thus, we made sure that sales, the different proportions of sales, the number of employees, and the variables we constructed from these entities were measured almost at the same time in the regression models of success, i.e., at the end of 1996 (sales) or at the beginning of 1997 (number of employees and number of employees in administrative units).

Proportion of unskilled and semi-skilled workers: Firms were asked about the qualification level of their employees. We took the ratio of unskilled and semi-skilled workers to the total number of employees as a covariate. This variable accounts for differences in human capital that should have an effect on the likelihood of an organization becoming aware of current developments outside the organization and on organizational success.

Use of computerized technology: Firms were asked whether they used computerized technology exclusively, predominantly, rarely or not at all for production. All firms which used computerized technology at least predominantly were coded with 1 and all other organizations with 0.

Working-time model: Those firms which have implemented one or several working-time models allowing deviations from regular daily working time were coded with 1 and all other organizations with 0.

The last variable stands for the willingness of the organization to implement modern concepts of management. Moreover, proponents of this concept argue that implementation enhances a firm's performance.

Results

Table 1 shows the descriptive statistics and correlations of the whole sample. Therefore, there are no statistics on the different ISO probabilities depicted. The comparison of the means of the variables which were measured in different waves shows that there are no considerable differences. Also, the correlations between those variables are quite high.

Before we present the results of our hypotheses testing, we want to briefly outline the results of selection equations that we estimated in order to calculate the individual probabilities of ISO 9000 certification or application for ISO 9000 certification (Beck/Walgenbach 2003/2005). The selection equations in Table 2 show that larger organizations, which are presumably more strongly scrutinized by the institutional environment, have a higher propensity to gain ISO 9000 certification or to apply for such certification. A larger proportion of administrative staff, which can be regarded as the window to the institutional environment (Dobbin et al. 1988), also causes a higher probability of ISO 9000 certification or a significantly higher probability that a firm will apply for certification in the future. Moreover, the model in which certified firms are compared to firms that were neither certified nor planned to obtain certification shows a negative effect of the proportion of customized production on the probability of ISO 9000 certification. This can be explained by the demands for flexibility of firms that produce in small units.

Furthermore, the likelihood of ISO 9000 certification increases with the predominant use of computerized technology. The likelihood that a company will apply for ISO 9000 certification (model 3) increases significantly if a firm is located in East Germany. This means that East German firms in 1996 were not more likely to be ISO 9000 certified but did have a higher propensity to be in the process of obtaining certification. Obviously, East German firms that had not yet been certified in 1996 were more willing to catch up than West German firms.

Table 1. Descriptive statistics and correlations

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10
1. Log (sales per employee)	-1.642	.489	1.000									
2. ISO certified	.285	.451	0.260	1.000								
3. Appl. for ISO certification	.400	.490	-0.092	-0.517	1.000							
4. East German firm	.183	.387	-0.419	-0.054	0.048	1.000						
5. % of custom. small batch product./100	.824	.296	-0.053	-0.110	0.009	0.025	1.000					
6. % of sales with indust. Custom./100 96 wave	.848	.288	-0.134	-0.020	0.013	-0.010	0.074	1.000				
7. % of sales with indust. customers/100 97 wave	.860	.275	-0.162	-0.075	0.016	0.007	0.088	0.751	1.000			
8. % of sales with publ. customers/100 96 wave	.042	.119	0.078	0.055	-0.017	0.064	-0.015	-0.501	-0.490	1.000		
9. % of sales with publ.. customers/100 97 wave	.042	.119	0.102	0.076	-0.033	0.014	-0.029	-0.427	-0.502	0.847	1.000	
10. Log (N of employees) 96 wave	4.172	1.019	0.321	0.441	-0.155	-0.116	-0.085	-0.053	-0.072	0.064	0.072	1.000
11. Log (N of employees) 97 wave	4.165	1.015	0.283	0.449	-0.164	-0.117	-0.089	-0.040	-0.068	0.056	0.071	0.977
12. % of administrative staff/100 96 wav	.201	.125	0.215	0.132	-0.017	-0.037	0.030	-0.186	-0.171	0.066	0.075	0.044
13. % of administrative staff/100 97 wave	.199	.123	0.246	0.123	-0.033	-0.067	-0.028	-0.175	-0.165	0.093	0.102	0.084
14. % of un- and semi-skilled empl./100	.139	.166	0.026	0.061	0.011	-0.269	-0.429	-0.041	-0.005	-0.035	-0.012	0.071
15. Predom. use of computer. technology	.481	.499	0.071	0.205	-0.072	-0.146	-0.099	0.116	0.110	-0.072	-0.036	0.229
16. Working time model	.529	.499	0.116	0.158	-0.037	-0.042	0.004	0.018	0.002	0.031	0.061	0.259
17. ISO certified* East German firm	.042	.202	-0.092	0.335	-0.173	0.447	0.011	0.021	0.029	-0.003	-0.003	0.135
18. Appl.. ISO certif. East German firm	.082	.275	-0.260	-0.190	0.367	0.633	0.029	-0.023	-0.008	0.053	-0.008	-0.109

			11	12	13	14	15	16	17	18		
11. Log (N of employees) 97 wave			1.000									
12. % of administrative staff/100 96 wave			0.036	1.000								
13. % of administrative staff/100 97 wave			0.066	0.687	1.000							
14. % of un-and semi-skilledempl./100			0.068	-0.124	-0.049	1.000						
15. Predom. use of computer. technology			0.241	-0.133	-0.103	0.021	1.000					
16. Working time model			0.255	0.040	0.046	-0.064	0.085	1.000				
17. ISO certified* East German firm			0.133	0.054	0.033	-0.104	0.039	0.019	1.000			
18. Appl. f. ISO certif.* East German firm			0.114	-0.033	-0.065	-0.175	-0.148	-0.021	-0.063	1.000		

Table 2. Probit models of the probability of ISO 9000 certification or application for certification

	ISO certified vs. no ISO certification planned	ISO certified vs. current application for certification	Current application for ISO vs. no ISO certification planned
Constant	-3.624*** (0.441)	-3.067*** (0.412)	-1.103*** (0.390)
East German firm	0.149 (0.167)	-0.026 (0.147)	0.254* (0.135)
% of customized and small batch production/100	-0.382* (0.223)	-0.219 (0.204)	-0.198 (0.193)
% of sales with industrial customers/100	0.244 (0.254)	-0.079 (0.239)	0.250 (0.208)
% of sales to public agencies/100	0.584 (0.515)	0.356 (0.503)	0.438 (0.531)
Log (N of employees)	0.649*** (0.065)	0.552*** (0.062)	0.183*** (0.061)
% of administrative staff/100	2.311*** (0.478)	1.149** (0.423)	1.294*** (0.458)
% of unskilled and semi-skilled employees/100	0.641 (0.418)	0.092 (0.396)	0.612 (0.350)
Predominant use of computerized technology	0.421*** (0.127)	0.387*** (0.113)	0.151 (0.106)
Working time model	0.139 (0.125)	0.122 (0.113)	0.097 (0.101)
N	558	639	665
Pseudo R^2	0.26	0.17	0.03

*** p<= 0.01 ** p<= 0.05 * p <= 0.1

The models in Table 3 show that – according to our hypotheses – ISO certification leads to significantly higher sales per employee, when ISO 9000 certified firms are compared with firms which do not intend to obtain certification and firms which have no certification but are currently applying for it. Application for ISO 9000 certification, on the other hand, does not lead to a significant enhancement of sales (third model). Obviously, the effect of ISO 9000 on the inflow of resources depends on its degree of public 'visibility' (Carroll/Swaminathan 2000). Thus, hypothesis 1a is supported, while hypothesis 2a is not. Moreover, the individual probabilities of either being certified or applying for certification have significant positive effects, as expected.

East German firms have much lower sales per employee than West German firms. This result confirms the general finding that East German firms have had lower returns in the 1990s than West German firms (Wolf/Zwick 2002/2008).

The effect of the interaction term between ISO 9000 certification and East German firms in the first subsample is as we expected. However, it is not significant. The interaction in the second subsample shows no effect. This means that East German firms do not benefit significantly more from ISO 9000 certification than West German firms. Consequently, hypothesis 1b is not supported by these data. Interestingly, the interaction in the third subsample between application for ISO 9000 certification and East German firms shows a significant positive effect, thus lending support to hypothesis 2b. The comparison of firms applying for certification with firms which were not certified and did not plan to obtain certification shows that East German firms which were applying for ISO 9000 certification benefited to a greater extent from application for certification than West German firms did. In other words: application for certification was rewarded in East Germany but not in West Germany. In West Germany, applying for something which is taken for granted does not increase the legitimacy of a firm. However, in East Germany ISO 9000 certification seems not to have been taken for granted to the same extent. Therefore, firms which show their general willingness to comply with institutionalized standards of quality management are rewarded for this. The lacking significant interaction effect between actual ISO 9000 certification might be explained by the fact that in West Germany, certification is rewarded so highly that East German firms find it hard to gain additional rewards. An alternative explanation is that East German firms are more successful at publicizing their application for certification.

Table 3. Linear regressions of sales per employee

	I ISO certified vs. no ISO certification planned	II ISO certified vs. current application for certification	III Current application for ISO vs. no ISO certification planned
Constant	-1.415*** (0.313)	-1.247*** (0.167)	-2.058*** (0.139)
ISO	0.157*** (0.048)	0.139*** (0.044)	0.004 (0.035)
P(ISO)	0.731** (0.372)	0.804*** (0.251)	1.042* (0.588)
East German firm	-0.646*** (0.065)	-0.494*** (0.051)	-0.696*** (0.093)
ISO*East German firm	0.109 (0.095)	-0.008 (0.090)	0.132* (0.072)
% of customized and small batch production/100	0.053 (0.072)	-0.076 (0.064)	-0.043* (0.070)
% of sales to industrial customers/100	-0.184* (0.096)	-0.209** (0.078)	-0.192** (0.090)

% of sales to public agencies/100	0.064 (0.169)	0.017 (0.150)	0.100 (0.185)
Log (N of employees)	-0.076 (0.084)	-0.065 (0.047)	0.018 (0.056)
% of administrative staff/100	0.202 (0.286)	0.199 (0.163)	0.570* (0.296)
% of unskilled and semi-skilled employees/100	-0.417** (0.144)	-0.413*** (0.114)	-0.547*** (0.168)
Predominant use of computerized technology	-0.108* (0.059)	-0.150*** (0.044)	-0.066 (0.044)
Working time model	-0.008 (0.040)	-0.022 (0.046)	0.001 (0.040)
N	558	639	665
R^2	0.35	0.30	0.39

*** p<= 0.01 ** p<= 0.05 * p <= 0.1

The control variables demonstrate the following effects: In the second and the third sub-samples, the proportion of customized production has a negative effect on sales per employee, which is significant in the third sub-sample, most likely because these organizations lack economies of scale. A higher percentage of sales made with industrial processors and consumers leads to significantly lower sales per employee. The percentage of sales made to public agencies has virtually no effect. Moreover, a large proportion of administrative staff displays a significant positive effect on sales per employee, which is significant in the third sub-sample. A large proportion of unskilled and semi-skilled workers has a significant negative effect, indicating that a greater amount of human capital increases the sales of the organization. Surprisingly, the predominant use of computerized technology in two of the three models leads to lower sales per employee. Figure 1 illustrates the key results of our study. It highlights the significant effects of the selection equations as well as the two hypotheses that are supported by the collected data.

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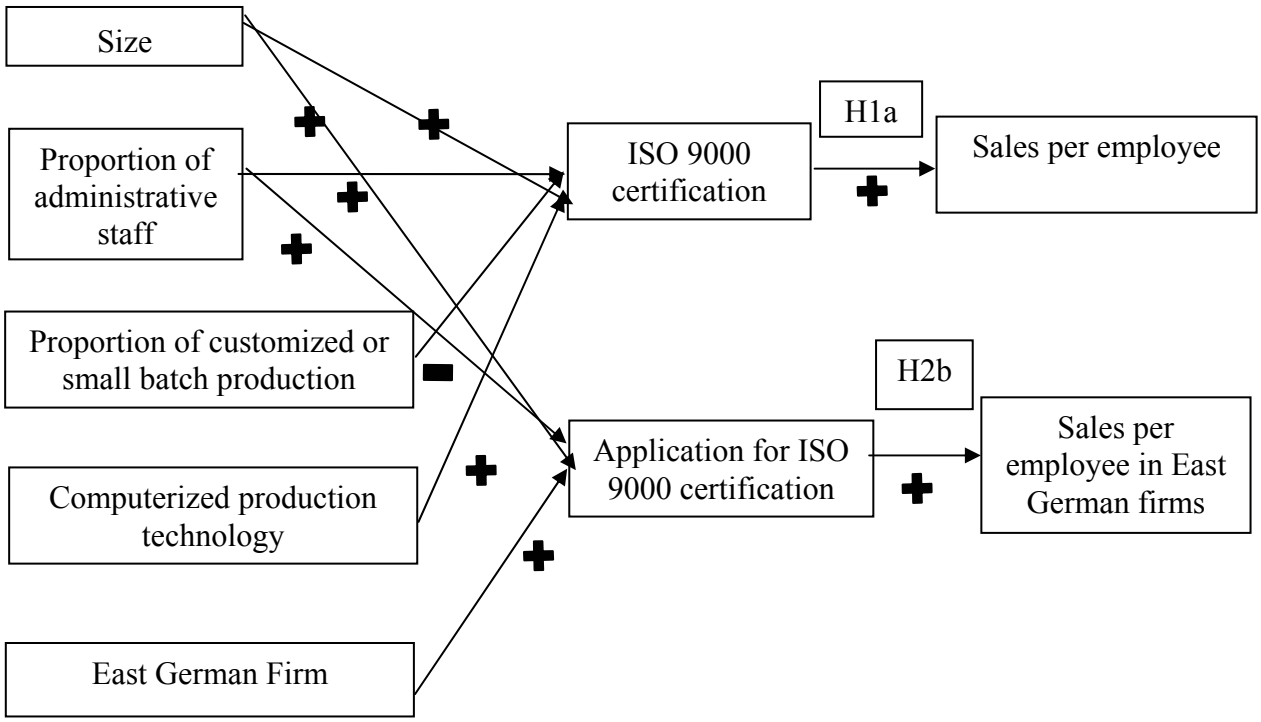
Figure 1. Summary of important results



Discussion and implications

The results of our study show that there is a strong relationship between ISO 9000 certification and inflow of resources. Our findings suggest that organizations are rewarded for complying with institutionalized expectations and implementing ISO 9000 standards. Thus, one important implication our study has for practitioners is that compliance with institutionalized expectations not only increases the legitimacy of a firm – as many studies in the tradition of institutional theory have shown (Walgenbach/Meyer 2008) – but may also have substantial economic effects. Obviously, the existence of a quality management system based on the ISO 9000 standards makes it easier for customers to evaluate the quality of a firm's products – regardless of whether the standards actually result in an improvement in quality, which subsequently leads to an increase in sales. However, when East German firms – which suffer from a reputation for making low-quality products – obtain ISO 9000 certification, they do not have a significant advantage over West German firms. We expected such an advantage because compliance with institutionalized norms of quality control should pay off, especially in environments where product quality is generally disputed. On the other hand, in contrast to West German firms, East German

firms benefit from applying for ISO 9000 certification. In West Germany, the mere application for something which is more or less taken for granted does not generate any rewards, i.e. higher sales. In West Germany, only if firms prove their compliance to standards that are taken for granted by presenting their ISO 9000 certification do they have advantages over non-certified firms.

East German firms also benefit from certification. These benefits however, do not significantly differ from those that their West German counterparts receive. However, compared to West German firms, they have higher sales when they apply for certification. In an environment where the quality of products is frequently questioned by customers, application for proof that an organization meets ISO 9000 standards is obviously regarded as a positive signal that the organization is striving to improve the quality of its products. However, another explanation is possible: When the data for this study was collected (1996), East German firms may have become more aware of the benefits of ISO 9000 certification. Therefore, they may have been more successful in showing their customers that they are willing to implement ISO 9000 standards although they were not yet certified. Because West German firms may have not been so eager to make their application public, they did not benefit from application. This reasoning is supported by the higher propensity of East German firms applying for ISO 9000 certification in 1996.

In any event, this study has shown that compliance with institutionalized norms may have different effects in terms of the inflow of resources in different institutional environments. We therefore argue that future work on institutionalized practices should account for the different environments in which organizations are located. Thus, the classic distinction between "technical" and "institutional" environments (Meyer/Rowan 1977) should be expanded and refined.

Another implication of our study is based on a limitation it has. We were not able to distinguish East German firms that were independent entities or branches of East German companies from East German firms that were either a branch of a West German or an international firm. However, as we have mentioned, we do not believe this limitation has a strong impact on the results of our study: Only very few East German firms are not single-unit organizations. Whether East German multi-unit firms have headquarters in West Germany or other Western countries or whether their headquarters is also located in East Germany cannot be assessed with our data. Nevertheless, future studies should thus focus on the question as to whether there is a spillover effect, in terms of legitimacy and reputation, from headquarters that operate in an environment with a high reputation for quality to subsidiaries in environments with poorer reputations, which may have a negative effect on the economic consequences of compliance with institutionalized expectations. Further, future studies should also address

whether or not other factors, such as the maturity of organizations, play a significant role with respect to the benefits of ISO 9000 certification.

Our study analyses the economic effects of the adoption of one specific management concept, namely ISO 9000 standard. Thus, it is an open question that should be addressed in future studies whether or not and to what extent the adoption of other institutionalized techniques has similar consequences. If it does, institutional theory, which was for long accused of having an anti-managerial bias (Donaldson 1995), may turn out to be a theory of the utmost importance to managerial practice.

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