Research Report

Determinants of Grid Assimilation in the Financial Services Industry

FINANCIAL SERVICES PROVIDERS ARE EXPOSED TO DIFFERENT SOURCES OF INSTITUTIONAL PRESSURE ARISING FROM THE INTENSE COMPETITION AND REGULATION IN THE BANKING SECTOR. AGAINST THIS BACKGROUND, THIS ARTICLE ANALYZES THE DETERMINANTS OF GRID ASSIMILATION AND THE ROLE OF INSTITUTIONAL PRESSURE IN THE GRID ASSIMILATION PROCESS.

Martin Wolf
Roman Beck

Jens Vykoukal

Motivation

Financial services providers are exposed to different sources of institutional pressure arising from the intense competition and regulation in the banking sector. Against this background, the implementation of Grid technology can be seen as a potential strategic response to increasing requirements in terms of complex new financial products, the assessment of arising risks, and sophisticated investment strategies. So far, however, little empirical research has been conducted to quantify the determinants of Grid assimilation in the financial services industry. In the following, a theoretical perspective on the organizational drivers and inhibitors of Grid assimilation (see hypotheses 1-5, Figure 1) and the role of institutional pressure in the assimilation process (see hypotheses 6-8, Figure 1) is introduced. This conceptualization is evaluated based on 197 complete responses from North American IT decision makers of financial services providers. The results from partial least squares analyses suggest a strong positive impact of mimetic and normative pressure on Grid assimilation, but surprisingly do not support the hypothesized strong relationship of coercive pressure on Grid assimilation.

Grid Computing as Strategic Response to Environmental Pressure

Due to its hyper-competitive market and high regulatory pressure, the financial services industry is particularly exposed to a high level of institutional pressure that forces firms to comply with regulatory and environmental norms (Ang & Cummings, 1997). Moreover, the financial services industry exhibits information-intensive business processes, high computational demands, and fast changing customer needs. These industry characteristics are reflected by its above average annual IT investment (approx. 8% of the annual revenues), which is almost twice as high as in other industries (Zhu et al., 2004). One way to meet arising institutional and computational challenges is the assimilation of a Grid-based IT architecture that facilitates the ability to accelerate resource-demanding computations and data mining operations. By these means and by the aforementioned computational and data mining capabilities, the timely assessment of complex financial products and available risk exposure becomes feasible, eventually fostering regulatory compliance and organizational legitimacy.

Technological Context	Definition
Grid Infrastructure Capability	The firm's technical capability resulting from having extensive access to distributed computing power and purpose-specific technologies (e.g., a high-capacity, low latency network).
Grid Technology Integration	The degree of inter-connectivity among applications and the inter- and intra-organizational backend systems or architectures.
Organizational Context	**Definition**
Grid Technology Competence	Explicit knowledge and skills (e.g., distributed systems programming skills, knowledge of virtualized environments) owned by the firm's IT staff that are needed to successfully develop Grid architectures and Grid applications.
Grid Implementation Management Capability	Operational middle management capability to successfully monitor and guide through the process of Grid assimilation from both a technological and business-driven perspective.
Firm Size	Firm size as surrogate of organizational innovativeness and flexibility.
Environmental Context	**Definition**
Mimetic Pressure	The pressure to imitate structurally equivalent successful organizations in the same industry without necessarily considering the firm-specific context.
Coercive Pressure	The pressure grounded in societal expectations and dependencies towards other firms. In case of the financial services industry, regulatory pressure decisively drives or restricts the assimilation of new technologies.
Normative Pressure	Pressure that is rooted in the ongoing process of professionalization. This pressure arises from the exchange of best practices among business partners, suppliers, and the government.

Table 1: Determinants of Grid Assimilation

Determinants of Grid Assimilation

Based on a literature review and several expert interviews, different core determinants involved in the Grid assimilation process on the organizational level can be identified. Basically, these determinants can be summarized as representations of the technological, organizational, and environmental context (see Table 1).

Discussion

In essence, our results suggest that there is a substantial positive impact of mimetic and normative pressure on Grid assimilation (see Figure 1). In detail, mimetic behavior and professionalization tendencies (normative pressure) are very present in the process of Grid assimilation in the financial services industry. The significant impact of mimetic pressure indicates technological uncertainty or ambiguity in the financial services industry leading to the facilitation of mimicry among competitors. As far as the professionalization tendencies in the financial industry are concerned, Grid assimilation can be assumed to be a strategic response towards arising institutional pressure. Vendors and customers increasingly demand more sophisticated financial products and investment strategies, thus requiring improved data mining and data processing capabilities as provided by Grid architectures. Surprisingly though, we are not able to find a significant path leading from coercive pressure towards Grid assimilation as hypothesized. This is especially astonishing since the financial services industry is exposed to a very high level of regulation and thus direct governmental impact (coercive pressure). However, this indicates that there is a mediating agency (e.g., top management) involved in the causal relationship between coercive pressure and (Grid) assimilation (Liang et al., 2007) facilitating the sensemaking of Grid systems in terms of regulatory compliance. Surprisingly, Grid technology competence is not found to significantly impact on Grid assimilation, which is counterintuitive. This might be grounded in the fact that virtualized Grid infrastructures are a rather smooth evolution of well-established concepts such as cluster computing and Service-oriented Architectures, not exhibiting high visibility towards end users and thus not necessarily requiring idiosyncratic technical competences. Interestingly, our results suggest that especially the conceptualized complementarity of Grid infrastructure capability, Grid technology integration, and Grid implementation management capability as surrogate of organizational Grid readiness is decisively determining the Grid assimilation process. Among these factors, especially Grid implementation management capability as a representation of the middle management capability with regard to the operational management of both technical and business capabilities exhibits the strongest impact on Grid assimilation. Our findings emphasize that smaller financial services providers (but still with more than 1,000 employees) are more likely to be open-minded towards technological innovation such as Grids. This is reasonable due to the fact that smaller firms are exposed to a lower risk of reputational losses rooted in ill-conceived technological innovation. In addition, their lower level of exposure to public attention might generate space for a more flexible attitude towards (technological) innovation.

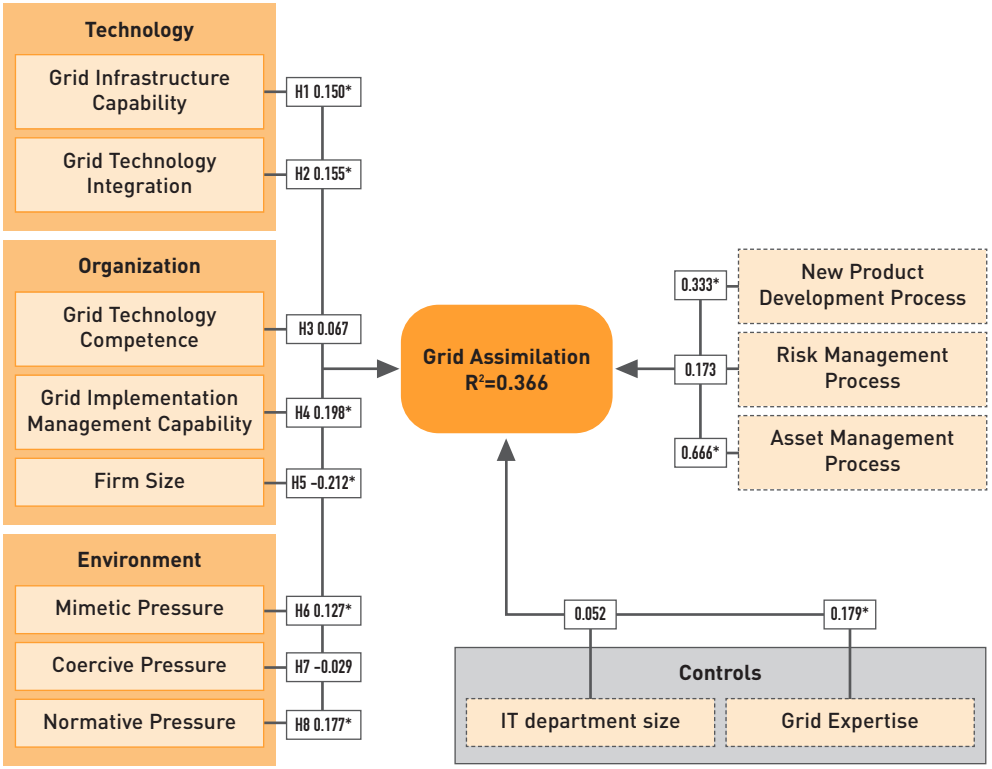

Figure 1: Empirical Results (N=197, *: significant at the 0.05-level)

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