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Conceptualizing Shadow IT Integration Drawbacks from a Systemic Viewpoint

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Received: 30 October 2018; Accepted: 29 November 2018; Published: 3 December 2018

Abstract: Business units are increasingly able to fuel the transformation that digitalization demands of organizations. Thereby, they can implement Shadow IT (SIT) without involving a central IT department to create flexible and innovative solutions. Self-reinforcing effects lead to an intertwinement of SIT with the organization. As a result, high complexities, redundancies, and sometimes even lock-ins occur. IT Integration suggests itself to meet these challenges. However, it can also eliminate the benefits that SIT presents. To help organizations in this area of conflict, we are conducting a literature review including a systematic search and an analysis from a systemic viewpoint using path dependency and switching costs. Our resulting conceptual framework for SIT integration drawbacks classifies the drawbacks into three dimensions. The first dimension consists of switching costs that account for the financial, procedural, and emotional drawbacks and the drawbacks from a loss of SIT benefits. The second dimension includes organizational, technical, and level-spanning criteria. The third dimension classifies the drawbacks into the global level, the local level, and the interaction between them. We contribute to the scientific discussion by introducing a systemic viewpoint to the research on shadow IT. Practitioners can use the presented criteria to collect evidence to reach an IT integration decision.

Keywords: shadow IT; IT integration; IT integration drawbacks; application integration; path dependency; path biography; switching costs

1. Introduction

Digitalization describes the introduction and usage of digital technologies in a social, individual, and organizational context [1]. In 2018, a survey of 3958 information technology (IT) leaders revealed that 61% see higher revenue growth than their competition when using digital technologies [2]. To achieve competitive advantage through digitalization, organizations have to massively transform their organizational structures, strategies, methods, business models, and enterprise architectures [1]. In the past, the implementation of new IT was mainly the task of the organization and the IT department; nowadays, user-friendly IT allows business units to shape digitalization [3]. If the business unit implements a new IT system on its own without a central IT department being involved during the development or the subsequent control, the phenomenon is called shadow IT [4]. The effect of shadow IT on the enterprise architecture of an organization has two perspectives: On the one hand, shadow IT introduces innovation into an organization and allows a higher flexibility for business units [5,6]. On the other hand, inefficiencies occur [7]: The heterogeneity rises, because business units choose

technology on their own. Complexity increases, because shadow IT is connected or exists parallel to formal systems. Integration, by linking or unifying shadow IT and the redundant enterprise system, could eliminate redundancies and solve associated problems [8]. A survey of 490 CIOs revealed that 64% regard IT integration as a priority, while simultaneously desiring a high degree of innovation and flexibility in the IT architecture of their organization [9]. Thereby, organizations find themselves in an area of conflict, as IT integration might eliminate the benefits that shadow IT offers [10]. Because organizations must be aware of these drawbacks before performing an IT integration, this paper aims at presenting a framework for shadow IT integration drawbacks.

Most studies on IT integration focus on the benefits and provide classifications for its factors [11]. Research on IT integration drawbacks focuses merely on monetary factors such as indirect and direct costs [12,13], or states that some integration technologies are more expensive than others [14,15]. Research on non-monetary factors considers IT integration barriers in environments such as hospitals [16] or governments [17] or for special methods like enterprise application integration (EAI) [15,18]. Thereby, none of these studies focus on the phenomenon of shadow IT [11]. Additionally, IT integration research in general lacks a link with the existing theory base [19]. Therefore, this paper contributes to the scientific discussion as it presents a theory-based view of shadow IT integration drawbacks using the systemic theories of path dependency and switching costs. Besides, practitioners can use the resulting framework to assess the drawbacks when coming to a decision on shadow IT integration.

The paper is structured as follows: At first, we introduce the problem that shadow IT causes in the enterprise architecture. Then, we illustrate our research approach consisting of our systemic theory base and the literature review that we conducted. Afterwards, we present the results and discuss them. Finally, we provide a conclusion and note possible future research directions.

2. Shadow IT in the Enterprise Architecture

Shadow IT describes IT systems that business units implement individually in their business processes, whereby they are not involved in an organizational IT management [20]. On the one hand, it has technological aspects because shadow IT occurs in various forms, such as local applications, spreadsheets, end devices, cloud services, or combined solutions [5], and needs technical support to function in an organization [6]. Yet, shadow IT also has social components because business employees are highly involved during its implementation and usage [21,22]. Therefore, we regard shadow IT as a socio-technical phenomenon [4].

In the beginning, shadow IT is often experimental and small, as it responds to an emergent need in the business unit [5,22]. Once established in the organization, shadow IT can grow large because business units share the benefits that the system provides for them [23]. Due to inertia on an individual as well as an organizational level, business users continue using shadow IT [22]. Thereby, it often gets intertwined with the enterprise architecture of an organization [24]. Shadow IT reinforces by emerging and reemerging in a cycle of time and cost pressures [4]. Thereby, it shapes the enterprise architecture and can become an important part of it [25]. Shadow IT exists alongside formal enterprise systems and either complements, expands, or supplements them [26]. Studies show that a redundancy of data or functionality exists in a majority of the cases [26], and that as a result shadow IT causes various inefficiencies in the enterprise architecture [7]: First, IT departments often do not know about shadow IT, which leads to an non-transparent enterprise architecture, the inability to manage it, and related risks. Second, responsibilities are often unclear, which reduces business-IT-alignment. Third, shadow IT increases the complexity of the enterprise architecture in various ways. The low standardization and integration and high heterogeneity prevent automation [10] and thereby hinder digitalization [27].

Organizations can solve these inefficiencies by converting shadow IT into business-managed IT. Thereby, they identify and include shadow IT in IT management [5,28]. However, redundancies of shadow IT and enterprise systems will remain, and organizations must take architectural measures to solve them. IT integration is an established concept to cope with these types of problems [16].

A common database or data interface can solve data redundancies, and a unification of shadow IT and the redundant enterprise system can remove functional redundancies [8,29].

Like in other IT integration decisions [30], organizations must valuate drawbacks and benefits of an integration of shadow IT and the redundant enterprise system. While many studies analyze IT integration benefits, no study discusses the drawbacks [11]. Some studies provide a classification based on direct costs, such as the implementation of the IT integration, and indirect costs such as training of employees [12,13]. Others compare different costs for different integration technologies, such as interfaces and unification of systems [14,29] or methods such as EAI versus point-to-point integration [17,31]. A discussion of non-monetary costs exists in the analysis of IT integration barriers. Here, research presents barriers that can occur during integrating systems, such as resistance to change [18] or technical incompatibility [32]. Overall, research lacks a synthesis of the discussions on monetary and non-monetary costs and a theory-based specification of these drawbacks to the phenomenon of shadow IT. Shadow IT research has started to target integration by pointing out redundancies [26] or providing evidence based on a small number of cases [27]. None of the research on shadow IT integration has presented a theory-base yet, and IT integration research lacks that in general [19]. Additionally, existing research on IT integration focuses on the benefits of an IT integration [11]. By providing a theory-based synthesis of the drawbacks, we can close this research gap. As a result, organizations can weigh the drawbacks against the benefits to come to an integration decision of shadow IT and enterprise systems. To be able to achieve this goal, we pose the following research question: Which drawbacks do organizations face when deciding about the integration of shadow IT and an enterprise system?

3. Research Approach

To answer our research question, this section first presents our theory background. Then, we show our research method that led to the conceptual model that we present in the next section.

3.1. A Systemic Viewpoint on Shadow IT Integration: Path-Dependency and Switching Costs

Path dependency is a concept introduced from evolutionary economics and explains occurring inefficiencies in a complex system from a systemic viewpoint [33]. Coming from the discussion on economical processes, the theory explains that historic choices of technology combined with several types of self-reinforcing effects, such as economies of scale, emotional reactions, or political processes that lead to increasing returns and the establishment of a dominant design [34]. However, after the dominant design has been established, markets may reside in an inefficiency, where a seemingly less appropriate solution has the greatest market share although other solutions might be technologically more appropriate [34]. In this inefficient state, users can no longer freely switch to another technology, but find themselves in a lock-in with the current dominant technology [33].

In this lock-in situation, the costs to switch to another technology are very high due to the high intertwinement of the technology with the organization [35]. These so-called switching costs are originally defined as "onetime costs that customers associate with the process of switching from one provider to another" [36], but are also applicable for switching technologies in an organization [35]. Switching costs are not only monetary costs but also include emotional or cognitive costs, such as the search for a new technology; learning; transaction costs; and costs due to loyalty, habit, and emotion [37]. Burnham categorizes eight switching costs into financial, procedural, and emotional types of switching costs using factor analyses on a survey on perceptions of 144 customers to change their service provider [36].

Information systems research increasingly recognizes that path-dependency is a relevant concept in the field of enterprise architecture [35,38] and suggests that it is an important theory base for the research field of IT integration [19]. We assume that path-dependency is suitable to shed light on the specific problem of shadow IT due to the following reasons: the last section explained that various effects lead to the intertwinement of shadow IT with the organization [4,23], and the high

involvement of business users during its implementation and usage [21]. This points to self-reinforcing effects that affect the evolution of the enterprise architecture and switching costs that arise. Often, shadow IT even becomes an important part of the enterprise architecture [24]. In these cases, the historic choice of shadow IT implementation can lead to various inefficiencies in terms of transparency, redundancy, and governance in the enterprise architecture, where organizations find themselves with resulting problems such as missing automation, regulatory requirements, data integrity, and unclear responsibilities [26]. These facts suggest that the self-reinforcing effects can even lead to a lock-in with the existing shadow IT.

In cases where the lock-in and the occurring inefficiencies stem from the redundancy of the shadow IT with the enterprise system, organizations can integrate the two systems [8]. Thereby, business units must change from using the old shadow IT to using the new, integrated system. Thereby, they must adapt their work routine. We therefore regard the transition of the old system to the new system as a switch and apply the concept of switching costs to assess the shadow IT integration drawbacks.

3.2. Research Method

Because IT integration is a mature topic with an existing body of research [19], we used a literature review to develop our conceptual model [39]. A lot of the conducted research in the field is done as case study research or practitioner surveys [19], which assure that our study is also practically relevant. Additionally, our research method needed to reflect the fact that shadow IT is a socio-technical phenomenon [4]. Therefore, we chose the Path Biography Method (PBM) to conduct the analysis in our literature review [40]. The approach of the PBM goes beyond the mainly quantitative-empirical methods of IS research focusing on technical aspects [41] as well as the management research that mainly concentrates on organizational aspects [42]. Rather, the PBM integrates both aspects of our research problem [40]. Additionally, it is useful for research areas that span disciplinary boundaries [40] and, although it is a fairly recent method, research suggests that it is relevant in the area of IT integration [43].

Figure 1 shows our research method. Our literature review consisted of a structured literature search and the analysis, where we used the PBM to conduct the coding.

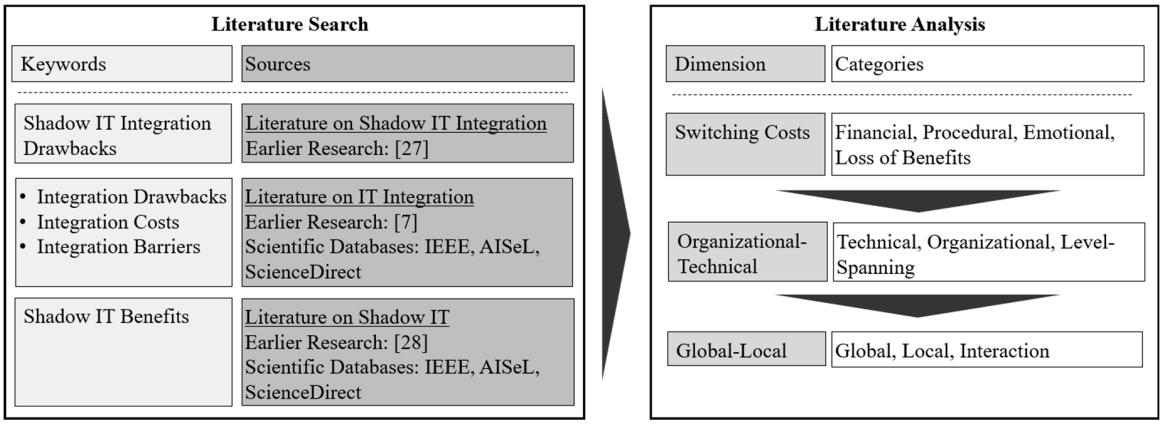

Figure 1. Research Method.

The first step in our research procedure was the collection of possible shadow IT integration drawbacks from shadow IT integration literature. Research on this specific topic is scarce and has covered its drawbacks only briefly [11]. Therefore, we expanded our search to literature on IT integration in general. Thereby, we consulted an existing review on IT application integration [11] and complemented these findings by a search on literature starting from 2017 on using the keywords *integration costs*, *integration barriers*, or *integration drawbacks* in title or abstract in the databases of IEEE, AISeL, and Sciencedirect. Additionally, because possible drawbacks from integrating shadow IT mainly stem from its loss and the following loss of its benefits [27], we scanned a former review

on shadow IT on literature of shadow IT benefits [28]. We complemented this review by conducting a literature search in IEEE, AISeL, and Sciencedirect using the keywords *shadow/feral systems*, and *shadow/grey/hidden/rogue IT* in combination with *information technology/services/systems/security*, in title or abstract from 2017 on. After we finished the literature collection, we scanned it for specific drawbacks, excluded those that made only vague or relative statements or did not mention any specific factors, and in the end, removed duplicates.

In a second step, we used an approach of coding [44] to assign the found criteria to pre-set codes following three sub-steps: First, we used the concept of Burnham that divides switching costs into procedural, financial, and relational costs [36]. Principle 1 of the PBM requires one to focus on the self-reinforcing effects that cause the inefficiency [40], which is, in our case, the redundancy of shadow IT and the enterprise system. To adapt the model to this specific situation and make it valuable for shadow IT research, we added a fourth cost category that accounts for the loss of shadow IT benefits. Second, to comply with principle 2 of the PBM, we additionally differentiated between the technical, organizational, and level-spanning drawbacks. Third, we mapped them to the local level, the global level, or the interaction of the levels following the third principle of the PB. Thereby, our knowledge from shadow IT literature and the fact that most of the literature was practical case study research helped us to evaluate the criteria on a fit to the specific phenomenon of shadow IT integration. One author conducted the analysis and discussed the results with the other authors. In several iterations, we thereby refined and evaluated the criteria and their mapping. As a result, a three-dimensional framework of shadow IT integration drawbacks emerged that we will present in the next chapter.

4. Results

This chapter discusses the findings from the literature search and the first step of the literature analysis. Afterwards, we present the results with a focus on the second and third step of the analysis.

4.1. Findings from Literature Search

The first step in our literature search was the search in the research field of shadow IT integration. Hereby, as expected due to the topic being not very well covered, only one study emerged. Second, we searched the literature on IT integration. Relying on an earlier literature review [11], we collected 14 studies.

From the additional search in the scientific databases, we only collected one more study, because the others did not mention specific cost dimensions. Vague statements regarding costs are rather common in this field of study [19]. Last, we consulted the literature on shadow IT. Based on an earlier review [28], we collected seven relevant studies that mentioned specific shadow IT benefits. The additional search in the databases resulted in two more studies. In total, after removing duplicates, we collected 25 studies (Table 1).

Table 1. Results of Literature Search.

		Literature on Shadow IT Integration	Literature on IT Integration		Literature on Shadow IT	
	Sources	[27]	[7]	IEEE; AISeL, ScienceDirect	[28]	IEEE, AISeL, ScienceDirect
IT Integration Costs	Found Studies	1	13	38	0	0
	Relevant	1	13	1	0	0
IT Integration Barriers	Found Studies	1	17	3	0	0
	Relevant	1	13	0	0	0
IT Integration Drawbacks	Found Studies	1	0	2	0	0
	Relevant	1	0	0	0	0
Shadow IT Benefits	Found Studies	1	0	0	44	15
	Relevant	1	0	0	7	2
Sum (unique, relevant)		1	14	1	7	2
Total		25				

4.2. Shadow IT Integration Drawbacks

The second step in our research process was the analysis of the literature using the principles of the PBM. As a result, we found three different dimensions of shadow IT integration drawbacks: the switching cost dimension consisting of the procedural, financial, and emotional drawbacks [36], as well as the loss of shadow IT benefits from the shadow IT literature. The second dimension is the organizational-technical dimension and the third dimension the global-local dimension.

4.2.1. Analysis from a Switching Cost Dimension

We assigned the found drawbacks to the four pre-set codes: financial, procedural, and emotional switching costs, and loss of shadow IT benefits. Table 2 shows the results of our coding and the corresponding sources. This sub-section focuses on the switching cost dimension but also gives reasons why we included them in the context of shadow IT integration.

Table 2. Result of Coding of Integration Drawbacks to the Switching Costs Dimension and Sources.

Pre-Set Codes: Costs Dimension	Properties: Integration Drawbacks	Sources
Financial: Financially quantifiable resources for	hardware	[12,13,18]
	software	[12,13,18]
	development/adaption	[12,13,17,18,30,32,45]
	maintenance	[13,15]
	external support	[12,13,18]
Procedural: Expenditure of time and effort for	project coordination	[12,15,45,46]
	employee training	[12,13,15,18,30,45,46]
	technology understanding	[12,16,47–49]
	top management support	[12,13,18,45]
	organizational restructuring	[13,18,30]
	process understanding	[12,13,15,18,30,45,46]
	communication	[12,13,18,45,46]
	changing culture	[12,13,15,18,30,45,50]
Relational: Psychological or emotional discomfort due to	sharing data	[18]
	using technology	[12,13,30]
	losing power	[13,18,30,45,49]
Loss of shadow IT benefits: Losing former	innovation	[5,6,51–54]
	flexibility	[5,27,55]
	productivity	[5,22,27,56]

The first factor in the switching cost dimension is financial expenditures that are "financially quantifiable resources" [36]. Those expenditures are monetary drawbacks, such as expenditures for integration hardware, software [12,18] mentioned by a few studies, or the initial adaption of the integration technology to the needs of the organization referred to by more than half of the studies [17,32,45]. Additionally, some include the costs that the maintenance of an IT integration causes [13,18]. Because shadow IT occurs in various forms [5], the monetary drawbacks for implementation, development, and maintenance also differ. Additionally, we include the external support. Although only one source mentioned this factor explicitly [12], depending on the integration technology, organizations might need external support to find suitable integration technology as well as to adapt it. Although the organization also must spend time and effort on the search and the coordination, the resources that the support needs are financially quantifiable.

Some drawbacks consist mainly of the procedural switching costs, which are "expenditures of time and effort" [36] that they cause. Factors included in this category are the employee training as well as the project coordination. Project coordination includes the time of the project team in general [12], but also the effort of coordination between departments [17] or the planning of the process and the needed

resources [46]. Depending on which technology the organization has chosen to integrate the shadow IT with the enterprise system, those expenditures may vary as well. Some studies stress that the organization has to understand [47,49] and then select the right integration technology [12,48]. Besides, research mentions that the organization also has to understand the process behind IT integration, which requires time and effort [15,18]. Additionally, top management support is very important [12,13], and the organization also, in some cases, has to restructure their processes [18,30] and communicate the change [46]. Those factors, again, also concern shadow IT integration. Most studies mention *culture change* as important. This includes changing the culture [13,18] due to the resistance to change that it causes in members of the organization [15,46]. Given the high involvement of business units during the lifecycle of shadow IT [4], we assume that this factor is especially relevant for shadow IT integration.

Relational switching cost, the "psychological or emotional discomfort" [36], is the third category. Factors that cause relational switching costs are sharing data [18] and using the new technology [12,30]. Losing power is an organizational factor that causes discomfort in certain members of an organization [18,49]. This factor might be especially relevant, because shadow IT research focuses on it as well [4,57].

The fourth category of switching cost is the loss of shadow IT benefits. Thereby, we found three important factors. Shadow IT is often innovative, in terms of processes or even technology [6,52,54]. An IT integration might eliminate this innovation if done with few considerations [10]. Another factor is the productivity that increases in a lot of cases [5,22,56]. Depending on how the organization handles the IT integration, this productivity increase might get lost. As a last factor we mention the loss of flexibility. Business units are able to adapt their solution to changing needs very easily [27,55]. An IT integration might eliminate the ability to adapt the solution in an easy and flexible way.

4.2.2. Analysis from an Organizational-Technical Dimension

Besides allocating the integration drawbacks to the switching cost dimension, we also analyzed them on the organizational-technical dimension (Table 3). Thereby, the organizational aspect of shadow IT integration comprises mainly the business unit and its interaction with the system and the avoided enterprise system [4]. Factors that we included here because they are mainly organizational are external support; the top management support; the organizational restructuring; the cultural change; as well as the loss of power, flexibility, and productivity.

Table 3. Result of Coding of Integration Drawbacks to the Organizational-Technical Dimension.

Pre-Set Codes: Organizational-Technical Dimension	Properties: Integration Drawbacks
Drawbacks from Organizational Change	External Support Top Management Support Organizational Restructuring Process Understanding Communication Cultural Change Losing Power Losing Flexibility Losing Productivity
Drawbacks from Technological Change	Hardware Software
Drawbacks from Level-Spanning Activities	Development Maintenance Project Coordination Employee Training Technology Understanding Sharing Data Using Technology Losing Innovation

The technical aspect focuses on the shadow IT technology and its support structures [4]. Here, we associate the monetary factors of the hardware and software.

In other factors, the organizational and the technical aspects are intertwined and a differentiation between the two aspects is hardly possible. Hereby, we assign the development and maintenance of the integration technology, which depends both on the technology but also on the developers [18]. We also included project coordination, because one source mentions the influence of tooling during this task [46]. The employee training and technology understanding both depend on the actors as well as on the technology. Sharing data and using the technology are discomforts that stem both from the user and the integration technology [12,30]. Losing innovation can have an organizational aspect if it comprises process innovation, but also a technical aspect if it involves the introduction of new technology [54].

4.2.3. Analysis from Global-Local Dimension

The third analysis of the shadow IT integration drawbacks focuses on the global and the local level of influence (Table 4). In our analysis, the global level is comprised of the organizational IT management that is responsible for IT integration, often represented by the IT department. Here, we assign the tasks of the project team, which are project coordination [46], technology understanding, organizational restructuring, and process understanding [12]. Top management support is required from the management of the organization [45] and is therefore also a global factor. The loss of innovation is also a factor on the global level, because shadow IT technology is innovative for the whole organization [54].

Table 4. Result of Coding of Integration Drawbacks to the Global-Local Dimension.

Pre-Set Codes: Global-Local Dimension	Properties: Integration Drawbacks
Drawbacks in the IT Department/Organization	Project Coordination Technology Understanding Top Management Support Organizational Restructuring
Drawbacks in the Business Units	Sharing Data Using Technology Losing Flexibility Process Understanding Losing Innovation
Drawbacks for the Interaction of Both Levels	Hardware Software Development Maintenance Employee Training External Support Communication Cultural Change Losing Power Losing Productivity

In our analysis, the local level represents factors that primarily affect the business unit. This is, because it is a crucial actor in the context of shadow IT [4]. One important factor is the culture change that the business unit must undergo due to a new technology [13]. Additionally, they experience discomfort through sharing data [18] and using the technology [12]. Also, business units might lose flexibility in their work routine due to IT integration [55].

We assign some factors to the interaction between the two levels. Expenditures for hardware, software, development, and maintenance of the solution might occur on the global but also on the local level. Who pays for the IT integration depends on the cost structure of the organization but also on the

negotiation between the IT and the business department. Employee training is a factor that occurs on both levels. The IT department needs training to understand the integration technology [18], and the business unit needs training to use the technology [12]. Additionally, either the IT department might lose power [13,57] or the business unit [4]. Losing productivity also occurs on both levels, because while the business department loses productivity in their daily work, this productivity loss also affects the productivity of the whole organization [27].

4.3. Conceptual Framework for Shadow IT Integration and Discussion

Given the results of our literature analysis, we can reply to our proposed research questions: Which drawbacks do organizations face when deciding about the integration of shadow IT and an enterprise system? Figure 2 summarizes these findings, including the assignment of each factor to the three different dimensions: the switching cost dimension, the organizational-technical dimension, as well as the global-local dimension.

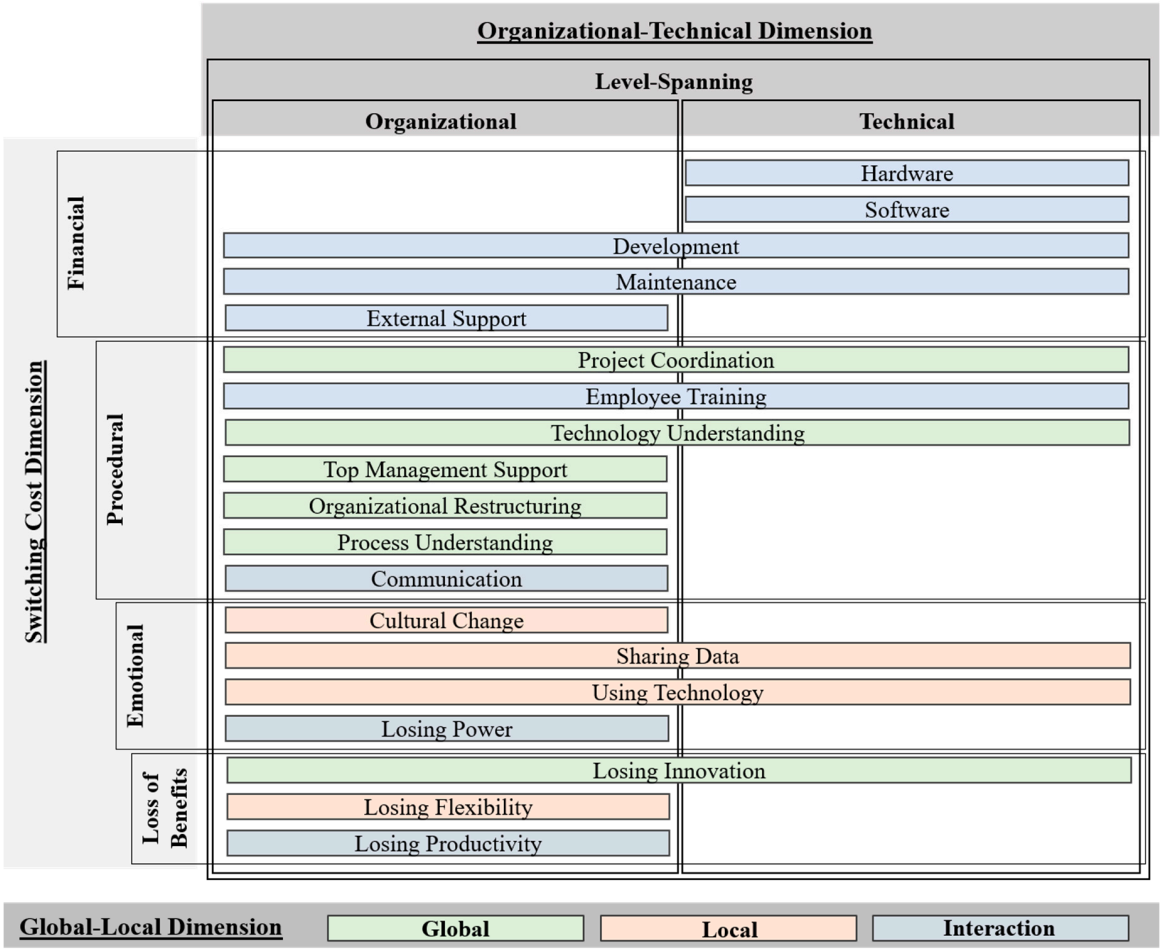

Figure 2. Shadow IT Integration Drawbacks—Conceptual Framework.

Our framework presents an overview of the 19 different factors that organizations must consider when integrating shadow IT with redundant enterprise systems. It integrates prior studies on integration costs and integration barriers. Additionally, it enhances and specifies then to the particularities of shadow IT. Thereby, it adds a theory base to IT integration research [19]. With the framework, organizations can first assess for each of the shown factors whether it is existent in their IT integration case or not. Second, organizations can use the framework to derive the impact that the relevant factors have. The visual representation allows organizations to consider multiple dimensions

at the same time. Thereby, it enables organizations to keep an overview about the different aspects that influence the factor and to target it accordingly.

From the switching cost dimension, they can identify whether the factor consists of monetary or non-monetary aspects [36]. A financial factor implies that organizations must assess the costs and include them in their budgeting processes. However, our framework shows that most of the drawbacks are not purely monetarily driven. Therefore, organizations should pay the same attention to each of the other three categories. A procedural factor indicates that organizations must identify the time of involving relevant stakeholders during the integration project. Afterwards, they must observe it in their resource planning. Change management is important, as it is a complex task that organizations must plan and execute carefully in a timely manner. An emotional factor highlights the existence of specific fears, which organizations need to address during their communication and change management. The introduction of the fourth category of drawbacks targets the particularities of shadow IT [11]. A loss of benefits has an impact on the choice of the integration technology, which should allow the flexibility for the business unit or keep the innovation. As a result, organizations align with the requirements of digitalization [1].

This overview of the organizational-technical dimension helps organizations to manage the social processes during the IT integration process [40]. Our framework indicates that the organizational aspect is as important or even more important as the technical one, given the number of factors that we assigned to the organizational side. This notion confirms prior research on the emergence of shadow IT [22] and stresses that organizations have to observe and manage the social and organizational processes.

The global-local dimension is especially important in shadow IT integration. Prior studies indicate the importance of the business unit that implements and maintains the shadow IT [4]. Our framework helps to keep in mind the actors on the different levels and enables organizations to target them with the right IT integration measures. Our results indicate that the global tasks of the IT department mainly consist of managing the IT integration process. However, most of the overall tasks occur in the interaction between the two levels. This points at the importance of the coordination and cooperation between the IT department and the business unit, which has been already pointed out by past research [5,22]. Thereby, it stresses the role of the business units and encourages organizations to actively seek and monitor their opinion toward possible IT integration.

5. Conclusions and Future Research

The goal of this paper was to present a conceptual framework of shadow IT integration drawbacks. To reach this goal, we conducted a literature review on IT integration costs and barriers but also on shadow IT benefits to be able to capture the particularities of shadow IT. As a result, we developed a framework of shadow IT integration drawbacks based on the concept of switching costs in the context of path dependency. The framework is multi-dimensional and includes organizational-technical factors as well as factors of global and local influences.

Practitioners can use our framework during the process of deciding whether to integrate shadow IT and an enterprise system. They can collect evidence following the presented criteria. The switching cost dimension helps to identify what type of drawback a specific factor causes, which organizations can then target using financial resources, change management, planning of resources, and choosing the right integration technology. The global-local perspective helps to identify and target the appropriate stakeholders.

We theoretically contribute to IT integration research by integrating the research streams of costs and barriers. Additionally, we enhance the research on shadow IT that can use this framework when coming to an IT integration decision. Besides, research can benefit from our framework to tackle the problems of digitalization that have to weigh letting business units innovate and integrating IT systems for data integrity in the enterprise architecture. Furthermore, the framework is based on the concept of path dependency and introduces this theory in the context of an IT integration decision.

Certain limitations are also present in our research upon which future research can be based. First, the framework presents factors but no measurement for these factors. Therefore, further studies may provide a measurement. Second, although based mainly on literature on case study research, the framework is only conceptual. It has not been evaluated in practice, which should be a focus of future research. Third, to come to an IT integration decision, the drawbacks must be integrated with the benefits of shadow IT integration. Future studies might develop a framework that includes the benefits as well as the drawbacks to gain a holistic view of shadow IT integration.

Author Contributions: M.H., C.R., S.Z. and C.F. are all part of the research project. M.H. performed the literature search and the analysis. S.Z., C.R. and C.F. reviewed and refined the analysis. M.H., S.Z., C.R. and C.F. mutually discussed the results as well as the scientific contributions and determined the structure of the research paper. M.H. wrote the paper and consulted S.Z., C.R. and C.F. regularly to receive their feedback on the structure and the content of the current status.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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