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# IT CONSUMERIZATION AND COMPLIANT USE: DO POLICIES MATTER?

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## Abstract

*Facing the ongoing IT consumerization trend, organizations take different strategies that permit or regulate the acquisition and use of consumer-originated IT devices at the workplace. This paper investigates the effect of two types of IT consumerization strategies ('laissez-faire' and 'middle ground') on the policy-related attitudes of employees and their level of policy-compliant device usage (voice, email, and data) at two higher education institutions. Based on hypotheses derived from two theories – i.e., procedural justice theory and transaction cost theory – and mixed methods interviews with 36 employees, our findings suggest a paradox where middle ground strategies accommodating for IT consumerization are associated with a higher understanding of, but a lower satisfaction with these policies. Differences in compliant behavior are found for voice and data usage on professional devices. Extending the procedural justice view, we conclude that transaction cost theory serves as a complementary lens to explain policy compliance.*

*Keywords: IT consumerization, Bring your own device, Shadow IT, Procedural justice theory, Transaction cost theory, Mixed methods.*

# 1 INTRODUCTION

IT consumerization, the employee-initiated use of consumer-originated IT devices at work, is an emerging trend attracting the attention of many IT leaders (e.g., Putri & Hovav 2014; Weiß & Leimeister 2012). Today, consumer devices, such as smartphones and tablet computers, infiltrate organizations empowering a user-driven IT change (Harris et al. 2012). IT consumerization implicates possible benefits and risks for organizations. Well managed, the pervasive trend can increase employee productivity and job satisfaction and even afford the opportunity to reduce IT costs (Giddens & Tripp 2014; Niehaves et al. 2012). On the downside, the shift of decision-making power regarding the selection of IT devices from IT units to employees can cause significant data security issues and lead to compliance and reputational threats (French et al. 2014; Morrow 2012). Furthermore, IT consumerization bears the risk of raising support costs due to the increased diversity of IT gadgets (Bernnat et al. 2010).

The unauthorized use of consumer devices can be associated with the phenomenon of ‘shadow IT’ (or ‘rogue IT’). Shadow IT has been defined as “all hardware, software, or any other solutions used by employees inside of the organizational ecosystem which have not received any formal IT department approval” (Silic & Back 2014, p. 274). The urge to use non-approved IT devices often originates from a misalignment between business and IT which fails to fulfill the users’ IT needs (Behrens 2009). Györy et al. (2012, p. 2) further elaborate that these “non-compliant user-driven innovations [...] pose a security threat in organizations.” Many companies see the need to ‘legalize’ the trend of IT consumerization by adopting IT policies which permit or regulate the use of consumer IT within the organization (e.g., Harris et al. 2012; Leclercq-Vandelannoitte 2015; Niehaves et al. 2012). Harris et al. (2012) identify three different IT consumerization strategies that organizations follow to cope with the new trend. The *laissez-faire* strategy stands for a low level of restriction with respect to the purchase and usage of consumer-originated IT devices. Middle ground strategies accommodate the user-driven purchase and usage of IT devices within a regulated framework, whereas the authoritarian strategy exercises tight control and implies standards for each category of technology (Harris et al. 2012). Yet, we know little about the effectiveness of these strategies (Moyer 2013). This question, however, appears important given the pertinent security issues related to the IT consumerization trend (Morrow 2012; Tokuyoshi 2013). Therefore, we address the question: (How) do different IT consumerization strategies affect the employees’ attitudes and their level of compliant device usage?

We build on procedural justice theory and transaction cost theory as two alternative theoretical lenses to hypothesize and explain relationships between purchasing and usage policies for consumer-originated IT devices as well as employees’ attitudes and compliant usage of devices. We designed a paired case study with a university that adopted the *laissez-faire* strategy (LFU) and a university that adopted the middle ground strategy (MGU). We aim to examine the level of compliant or non-compliant device usage, which can only be observed if the employees have certain discretion in their usage behavior. We therefore excluded the traditional authoritarian strategy from our analysis. Based on semi-structured interviews with organization-level stakeholders (e.g., CIOs, IT managers) and structured, in-person interviews with employees at the department level, we provide qualitative and quantitative evidence on the different policies and their effects on employees’ attitudes and behavior. Our findings suggests a paradox between the intention and the effects of the middle ground strategy, which we argue demonstrates a preeminence of transaction cost-based explanations of policy-compliant behavior over the procedural justice view to explain IT consumerization phenomena.

## 2 THEORETICAL BACKGROUND

### 2.1 IT Consumerization Strategies

The traditional model of corporate IT management as well as the authoritarian strategy of IT consumerization rely on strict policies and technical protection mechanisms regarding the use of IT devices (Györy et al. 2012). Professional IT devices are used for professional purposes and private IT devices

for private purposes only. The purchasing of professional IT devices is organized centrally, e.g., through a corporate IT purchasing unit.

These traditional strategies are increasingly challenged by the dissolving boundaries between professional and private IT use (Weiß & Leimeister 2012). Indeed, organizations take different approaches to react to the emerging IT consumerization challenge (Leclercq-Vandelannoitte 2015). Harris et al. (2012) present the ‘laissez-faire’ and ‘middle ground’ strategies to characterize purchasing and usage policies for private and professional IT devices. Laissez-faire implies that an institution has no or non-enforced usage and purchasing policies. Some of the organizations may simply “have no policies [...] in place; others may have them but do not enforce them” (ibid., p. 104). Whereas some IT departments simply ignore the fact of IT consumerization or tolerate it, others even provide IT support for private IT devices and applications used for professional purposes. Harris et al. (2012) emphasize that employees endorse the freedom of choice regarding the purchase and usage of consumer-originated IT devices.

By contrast, organizations that adopt a middle ground strategy are more restrictive and enforce their usage and purchasing policies. For instance, the organization might provide a personal IT allowance (‘gadget budget’), which employees can use to purchase IT devices such as smartphones or tablets from a predefined catalog of acceptable items. Given the short lifecycle of IT devices, this catalog of acceptable devices has to be continuously updated (Harris et al. 2012). The middle ground strategy is said to be particularly suited for organizations with employees who are “technically literate and expect to be able to use current technology to carry out their jobs” (ibid., p. 106).

## **2.2 Procedural Justice Perspective on IT Consumerization**

Procedural justice theory (PJT) is a common lens to explain an individual’s compliant or non-compliant behavior by the means of the individual perceived fairness of a decision process (Colquitt 2001; Kim & Mauborgne 1998). Originating from the field of organizational justice research, PJT has been applied in different research areas including politics and criminology (e.g., Mazerolle et al. 2014; Thibaut & Walker 1975; Leventhal et al. 1980; Colquitt 2001). Research on PJT has provided evidence that even if individuals cannot directly influence a decision-making process, they are more willing to accept its outcomes if they understand the emergence of a decision (Folger & Konovsky 1989; Greenberg 1993; Korsgaard et al. 1995; Lind et al. 1993; Tyler 2010). The understanding of the emergence of a decision is influenced by adequate justification and communication of the decision as well as transparent information (Colquitt 2001; Leventhal et al. 1980; Thibaut & Walker 1975).

The perceived level of procedural justice can be an important factor to explain an employee’s level of compliant behavior with an IT consumerization policy (Putri & Hovav 2014). Prior studies employing PJT suggest that there should be a relationship between the understanding of the procedure in which a policy has been formed and the level of compliance with this policy. For example, in a study conducted in a university setting, Colquitt (2001, p. 391) finds a “significant relationship between procedural justice and rule compliance.” In terms of IT consumerization, employee behavior that complies with the organizations’ policies can be achieved by making the development process and the content of these policies transparent through active communication. According to PJT, this will foster acceptance and commitment (Colquitt 2001). The employees’ understanding for the policy hence results in the willingness to act in a policy-compliant way.

## **2.3 Transaction Cost Perspective on IT Consumerization**

Transaction cost theory (TCT) explains the existence of firms based on their capability to perform particular transactions more efficiently than the market (Coase 1937; Williamson 1979). Generally, a transaction represents the exchange of a good or service between two entities, i.e., between organizations, organizational units, or individuals (Picot 1982). Individual transaction costs include coordination, search and information costs as well as bargaining and decision costs in terms of time and resources (Dahlman 1979). A transaction cost perspective assumes that individuals determine their behavior by balancing the respective costs of their alternatives (McCarthy 2002).

With regard to the IT consumerization phenomenon, employees either have the option to comply with the organizations' policies to satisfy an individual IT need through 'transacting' with an internal IT unit, or to provide themselves with a consumer-originated IT solution autonomously by potentially circumventing this unit (Winkler & Benlian 2012). In this respect, the tradeoff, which employees face between compliance and non-compliance, can be seen as a 'make-or-buy' decision (Zimmermann & Rentrop 2014). Hence, following the TCT inspired view on IT consumerization, employees will choose the alternative, which is least costly for fulfilling their IT needs.

### 3 RESEARCH MODEL

This section derives hypotheses based on the two theoretical perspectives to address our research question. As previously outlined, we subdivide an IT consumerization strategy to consist of a usage policy and a purchasing policy. According to the logic of our research model, the chosen IT consumerization strategy influences the employees' attitudes, which in turn influence the compliant (or non-compliant) usage of private and professional IT devices. The relevant variables, their hypothesized relationships, as well as their theoretical underpinnings are illustrated in Figure 1.

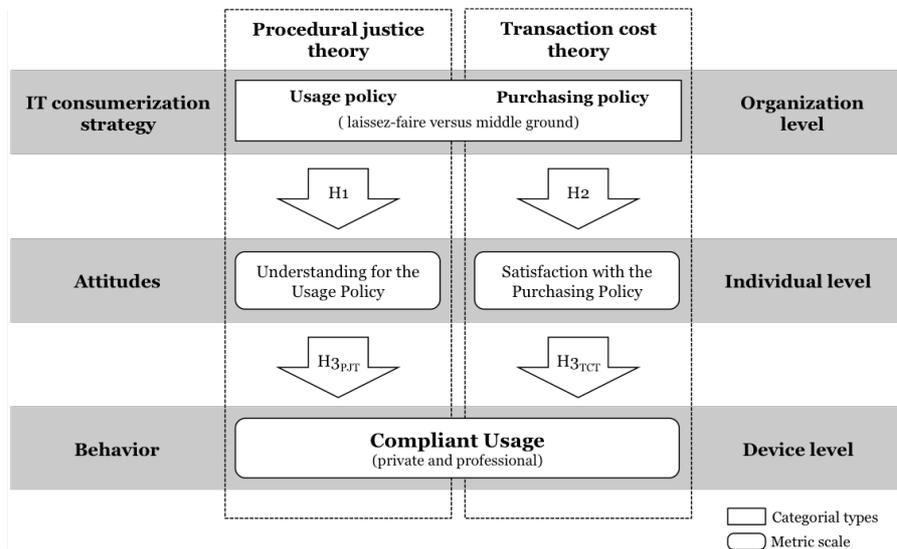


Figure 1. Research Model

#### 3.1 Strategy Effects on Employee Attitudes

Compliant device usage at our case organizations is defined as the exclusive use of professional IT devices for professional purposes and private IT devices for private purposes. According to PJT, users are more willing to accept a resulting decision and hence act compliant if they experience the decision-making process of the policy development as fair. That is, employees who are able to comprehend the rationale behind the emergence of the usage policy show a higher understanding for the usage policy and are hence more willing to use their IT devices in a policy compliant way. As stated in PJT, transparent communication and explanation provided by the decision-makers positively influence the attitude of the employees towards the usage policy, which is the driving factor for compliant usage. Also, Pahnla et al. (2007) found that information quality has a significant effect on policy compliance. Accordingly, the mere existence of a usage policy is insufficient to evoke compliant behavior (Stanton et al. 2005). However, the adopted IT consumerization strategy determines the level of policy enforcement, communication and information quality. The laissez-faire strategy implies that organizations may simply have no specified usage policy in place or refrain from enforcement (Harris et al. 2012). Consequently, the policies are typically either very poorly communicated or not existing.

In contrast, under a middle-ground strategy, policies are clearly defined and regulate the use of private and professional IT devices. The policies in typical middle ground organizations are enforced and

communicated openly. In sum, due to the higher importance and the transparent and active communication of the policies in middle ground organizations, the understanding for the usage policy should be higher under a middle ground strategy compared to a laissez-faire strategy. We posit:

**Hypothesis 1:** *The IT consumerization strategy is associated with the understanding for the usage policy. Specifically, the understanding for the usage policy is higher under a middle ground strategy and lower under a laissez-faire strategy.*

On the other hand, the TCT inspired view suggests that non-compliant behavior arises if the individual's costs of compliance exceed the utility of acting policy conform. The perceived costs of compliance are composed of any inconvenience induced by compliant behavior. In the case of inconvenient corporate IT device solutions or extensive bureaucracy caused by the purchasing policy, employees will become more unsatisfied with this policy and are more likely to bypass it (Bennett & Robinson 2000). Specifically, prior work suggests that "employees who are faced with constraints become frustrated" (Galperin 2002, pp. 44). Satisfaction with the purchasing policy thus can be understood as a proxy for an employees' level of approval with the corporate IT device solutions to fulfill individual IT needs.

Whereas a laissez-faire strategy implies no restrictions regarding the purchase of corporate IT devices, middle ground strategies typically limit the choice of approved IT devices to a predefined catalog from which employees can choose within a 'gadget budget' or alike. Besides the extensive bureaucracy induced by internal purchasing processes, the catalog might limit the choice to inconvenient IT device solutions. Purchases of IT devices outside this catalog are not possible or require formal approval, which implies additional bureaucratic effort. Costs of compliance are thus determined by the adopted IT consumerization strategy and likely higher under a middle ground strategy and lower under a laissez-faire strategy. Consequently, the satisfaction with the purchasing policy should be lower under a middle ground strategy and higher under a laissez-faire strategy. We posit:

**Hypothesis 2:** *The IT consumerization strategy is associated with the satisfaction with the purchasing policy. Specifically, the satisfaction with the purchasing policy is lower under a middle ground strategy and higher under a laissez-faire strategy.*

### **3.2 Strategy Effects on Compliant Behavior**

Both, PJT and TCT provide coherent, yet competing explanations for the effect of different IT consumerization strategies on compliant usage. According to PJT, users are more willing to act compliant if they are able to understand the emergence of a policy decision. Assuming the validity of H1, stating that middle ground strategies are related with a higher understanding and laissez-faire strategies are related with a lower understanding for usage policies, compliant behavior will be higher under a middle ground strategy and lower under a laissez-faire strategy. In other words, the improved communication of middle ground strategies leads to higher perceived procedural justice and, therefore, employees are more likely to act compliant to an organization's usage policy. Thus we can posit:

**Hypothesis 3a (PJT alternative):** *Compliant usage is higher under a middle ground strategy and lower under a laissez-faire strategy.*

TCT suggests that compliant behavior stems from low costs of compliance, i.e., when it is 'easy' for an employee to comply with an IT consumerization policy. Provided the validity of H2, stating that the satisfaction with the purchasing policy is lower under a middle ground strategy and higher under a laissez-faire strategy, this means that compliant behavior will also be higher under a laissez-faire strategy and lower under a middle ground strategy. To put it another way, with increasing complexity of the arrangements under a middle ground strategy, the perceived costs of compliance rise for the employees, who are therefore less satisfied. Employees who are unsatisfied with their organization's purchasing policies will be more incentivized to act non-compliant and deviate from the existing policies by finding their own consumer-originated IT device solutions (Bennett & Robinson 2000). Hence, we can also formulate the alternative hypothesis:

**Hypothesis 3b (TCT alternative):** *Compliant usage is higher under a laissez-faire strategy and lower under a middle ground strategy.*

## 4 METHOD

To address our research hypotheses, we designed a paired case study (Eisenhardt & Graebner 2007) with semi-structured interviews at the organization level as well as structured interviews at the user level. Pairs of cases enable to contrast and compare the evidence from the analysis of each case to derive compelling findings (Herriott & Firestone 1983). Because IT consumerization is a complex social phenomenon we combine the case study approach with mixed methods data collection (Bryman & Bell 2011). By triangulating the research objective using qualitative as well as quantitative sources of evidence, we aim to consider different perspectives within the institutions, develop a holistic understanding of the phenomenon of interest and hence generate more reliable results (Denzin 2009; Venkatesh et al. 2013). The overall research design is illustrated in Figure 2.

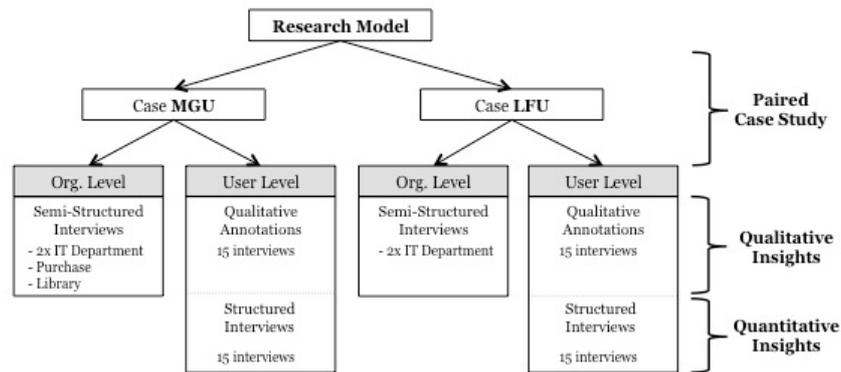


Figure 2. Research Design

The selection of the two cases, MGU and LFU, followed a theoretical replication logic (Yin 2014, pp. 57). The two selected universities are comparable in terms of their strategic focus and their size – both universities have more than 1,000 employees. However, the two universities have adopted different IT consumerization strategies and are therefore expected to yield varying findings regarding the variables of interest, thus providing “examples of polar types” (Eisenhardt 1989, p. 537). The setting of two higher education institutions is a particularly revelatory one to study the phenomena of IT consumerization and unauthorized IT use because researchers tend to have very specific and heterogeneous IT needs and relatively high freedom to fulfill these needs. At the same time, universities represent an environment with highly sensitive data and relatively strict privacy requirements, e.g., in terms of examination regulations and research outputs. Therefore, we regard the university setting as an adequate one to corroborate (or refute) the alternative theories about human behavior that this study is based on.

### 4.1 Organization Level Data

At both universities, we interviewed selected key informants who could provide us with insights on the organization’s IT consumerization strategy and relevant information on the policies from an organization level perspective. The interviewees were selected from initial contacts to the CIOs of both IT departments. At LFU, the department manager and the IT security officer were interviewed. At MGU, given its more complex IT consumerization strategy, we interviewed the CIO as well as managers of the IT department, the purchasing department, and the library.

Semi-structured in-person interviews were conducted in July and August 2014, each following a position-specific interview guide and lasting about one hour (Bryman & Bell 2011). The semi-structured interview technique allowed us to capture the same core topics across the two cases while maintaining enough flexibility to fully capitalize on the interviewees’ area of expertise (Saunders et al. 2012). Some interviewees provided additional documents such as reports about IT security, the purchasing catalog, the IT strategy, or the code of conduct. The interviews were audio-recorded and transcribed to facilitate the analysis. The resulting 98 pages of material were open-coded, starting with

initial categories from the interview guides (e.g., purchasing policy, usage policy, user needs, and communication) and adding emerging categories as needed (e.g., convenience, awareness, dispensation, and training).

#### 4.2 User and Device Level Data

Structured interviews with research staff in different positions at the Business Schools of the two cases were conducted and recorded. Our goal was to gain insights into the user level attitudes regarding the IT consumerization strategies as well as the actual usage of consumer devices for private versus work-related purposes. Interviewees participated voluntarily and were guaranteed anonymity. All interviews were conducted in person to create an atmosphere of trust, reduce obstacles and “improve the quality of disclosure” (Myers & Newman 2007, p. 16). The interviews, which took 10 to 30 minutes each, allow to complement the quantitative findings with qualitative insights about the employees’ motives, background information, or other factors that could facilitate the interpretation of the questionnaire results (Greene 2007). The demographics of the user level study are summarized in Table 1.

Gender		Male		Female	
	LFU	13		2	
	MGU	8		7	
Age (in years)		Minimum	Maximum	Average	STD
	LFU	25	34	29.63	03.07
	MGU	27	70	40.07	13.83
Job function		PhD	Other research staff	Post-doc/asst. prof.	Prof. (assoc./full)
	LFU	12	3	-	-
	MGU	5	4	4	2
Tenure (in years)		Minimum	Maximum	Average	STD
	LFU	0.1	5.0	2.57	1.55
	MGU	1.0	45.0	8.40	13.87

Table 1. *Sample Demographics on User Level*

The structured interview questionnaire had three sections: After the participant’s demographics, the questionnaire asked about the individual’s attitudes towards the organizations’ IT consumerization policies as well as about the consumer devices the employee uses, including privately and professionally purchased devices. For each of these devices, participants were asked to provide information about the amount and share of private and professional usage in three defined categories:

- Voice: implies all kind of voice communication including voice over IP
- Email: comprises editing, reading and sending emails
- Data: includes time spent on reading and editing documents such as papers and photos

The questionnaire development to collect quantitative data went through the steps recommended in survey research (Saunders et al. 2012). The questionnaire was pretested with two fellow researchers and refined to improve its comprehensibility. There were two versions in English and German language to accommodate for employees with different nationalities. Regarding the operationalization of the studied variables, the understanding for the usage policy and the satisfaction with the purchasing policy were measured by asking the interviewees to assess the single item “I understand the reason for the current content of the policies regarding the use of mobile devices at the university” and “I am satisfied with the current content of the policies regarding the purchase of mobile devices at the university”. We used five-point Likert scales with the scale anchors 5=’strongly agree’, 4=’rather agree’, 3=’neutral’, 2=’rather disagree’, and 1=’strongly disagree’.

The device usage behavior was assessed in a separate ‘loop’ type questionnaire section. The interviewees first had to specify the number and types of IT devices they were using, i.e., smartphones, tablets, or landline phones. Then, they estimated for each of these devices the private versus

professional usage of voice, email, and data. We opted to stick to appropriate self-developed five-point scales in order to adhere to a homogeneous structure of the answer types (Colton & Covert 2007). The estimated average usage for voice, email and data usage was measured in minutes per day, using the following intervals: ‘0-10’, ‘10-30’, ‘30-60’, ‘60-120’, and ‘more than 120 min./day’. The share of professional versus private usage was assessed using the following descriptors and percentages of professional usage: ‘exclusively professional’ (>95%), ‘mainly professional’ (75-95%), ‘mixed usage’ (25-75%), ‘mainly private’ (5-25%), and ‘exclusively private’ (<5% professional usage).

The variable compliant usage was calculated as an index for both privately purchased and professionally purchased IT devices. To calculate this index for each device, the share of professional usage in minutes per day for the three usage types voice, email, and data was weighted with the respective time spend on this category in relation to the overall time of usage for this device. The result is a percentage that states the share of the average professional usage of this device. For professionally purchased devices, this share of average professional usage was interpreted as a measure of compliant behavior. For privately purchased devices, the share of average professional usage was inverted, i.e., subtracted from 1, in order to obtain the share of the average private usage. Here, the average private usage was interpreted as a measure of compliant behavior. Hence, these indices represent the degree of compliant usage for each device and will be used to test the hypotheses for private and professional devices separately. The relevant variables of this research and their distribution in the sample are shown in Table 2.

Variable	Scale		Distribution			
	Min	Max	n	Mean	STD	
Understanding for the usage policy	1 (strongly disagree)	5 (strongly agree)	30	4.270	0.980	
Satisfaction with the purchasing policy	1 (strongly disagree)	5 (strongly agree)	30	3.670	1.373	
Employees’ level of compliant usage of private devices	0 (0% compliant usage)	1 (100% compliant usage)	Voice	40	0.814	0.247
			Email	27	0.302	0.295
			Data	29	0.513	0.335
Employees’ level of compliant usage of professional devices	0 (0% compliant usage)	1 (100% compliant usage)	Voice	24	0.828	0.252
			Email	15	0.879	0.123
			Data	16	0.584	0.371

Table 2. Key Variables, Operationalization, and Descriptives

## 5 CASE STUDY RESULTS

### 5.1 Organization Level Findings

#### 5.1.1 Laissez-Faire University

At LFU, the IT department is responsible for the IT infrastructure and the related IT services, security and support. The department manager and the IT security officer interviewed at the IT department are responsible for the internal IT consumerization policies.

The usage policy of LFU recommends to use professional IT devices for professional purposes and private IT devices for private purposes only. However, this policy is neither actively communicated nor enforced. Also, there is no central purchasing policy, which would regulate the purchase of IT devices for employees. IT devices are purchased based on justified necessity and individual negotiation over the research budgets of the departments (see Table 3). The organization-level interviewees describe their current IT consumerization strategy as a delicate act of balancing between accepting and prohibiting. Their main concerns are data security and protection issues especially because the academic staff handles confidential and personal data: “I hope that we will have clear policies in the future which ensure data protection and confidentiality on the one hand, while satisfying the user requirements on the other hand” (IT security officer, LFU). Furthermore, the responsible department

manager seemed to be aware of the fact that employees utilize, for example, their private smartphones for professional purposes: “We do not recommend it. We also do not say that we like it. But we provide support, of course, if absolutely necessary” (Department manager, LFU).

### 5.1.2 Middle-Ground University

At MGU, every member of the academic staff disposes over a personal research account. This money can be spent on any work-related issue such as IT devices, literature, or travel expenditures. For IT devices, these purchases are bound to a list of approved items (the catalog) that has been publicly tendered and awarded to a specific IT supplier (see Table 3). The catalog includes, for instance, a wide range of smartphones with iOS, Android, and Windows Mobile operating systems. Moreover, it is possible to apply for a dispensation if there is a justified necessity (e.g., research purposes). Through this catalog, the organization aims to fulfill the user needs for diverse consumer IT devices, while maintaining a controlled, manageable, and securable IT device landscape. The approval process and the addition of new devices to this catalog take time due to the involvement of various organizational units: “From the specifications to ‘actually have an agreement’ takes around six month” (Manager, purchasing department, MGU).

The policies at MGU are communicated openly and are accessible in the organizations’ intranet to ensure transparency to all stakeholders. These policies also state explicitly that professional IT devices should be used for professional purposes only, whereas private devices should not be used for work-related issues. The interviewees bewail that it is not possible to reach a more convenient solution for private use of professional devices, even though the frame contract for telephony is based on flat rates and it would not be a cost issue. However, the respective tax law states that if employees were allowed to use their corporate devices privately it would be a job benefit, which has to be subject to taxation.

Policy	Laissez-faire University (LFU)	Middle ground university (MGU)
Usage policy	Professional devices for professional and private devices for private purposes only.	Professional devices for professional and private devices for private purposes only.
Purchasing policy	No central guideline; based on justified necessity and individual negotiation.	Gadget budget, which can be used to purchase IT devices from a catalog of acceptable devices.

Table 3. Usage and Purchasing Policies at the Two Case Organizations

## 5.2 Descriptive Device Level Findings

In total, usage information on 72 IT devices (smartphones, tablets, conventional mobile phones, landline phones and others) could be gathered in course of the structured interviews, 42 at LFU and 30 at MGU. The distribution of privately and professionally purchased devices is depicted in Figure 3.

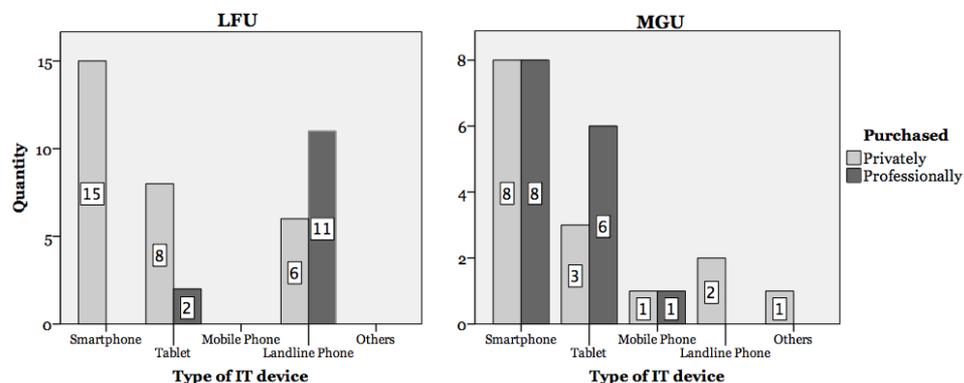


Figure 3. Distribution of Private and Professional IT Devices

Figure 3 suggests that the purchasing policies affect the purchasing behavior of the employees. Employees at LFU only use landline phones (11/17) and few tablets (2/10) purchased by the

university, while the smartphones are privately purchased (15/15). In contrast, many employees at the MGU purchase smartphones (8/16) and tablets (6/9) from their research budget. Landline phones are not used.

### 5.3 Hypotheses Tests

To test our hypotheses H1-H3 on the employees' attitudes and their compliant device usage, we performed t-tests for independent samples at the individual and device level across the two cases. Hypotheses are considered as supported for p-values below the 0.10 cut-off level. Table 4 shows the test results.

Hyp	Category	Hypothesis	Case	N	Mean	STD	p-value (t)	Result
H1	Individual level	Understanding for usage policy: higher under middle ground; lower under a laissez-faire	LFU:	15	3.870	1.187	0.026 (2.414)	supported
			MGU:	15	4.670	0.488		
H2		Satisfaction with purchasing policy: lower under middle ground; higher under a laissez-faire	LFU:	15	4.200	0.941	0.032 (-2.276)	supported
			MGU:	15	3.130	1.552		
H3	Device level (voice)	Compliant voice usage on private IT devices: different btw. laissez-faire and middle ground	LFU:	26	0.795	0.251	0.500 (-0.681)	n.s.
			MGU:	14	0.851	0.244		
	Device level (email)	Compliant email usage on private IT devices: different btw. laissez-faire and middle ground	LFU:	21	0.312	0.324	0.748 (0.325)	n.s.
			MGU:	6	0.267	0.181		
		Compliant email usage on professional IT devices: different btw. laissez-faire and middle ground	LFU:	2	0.850	0.000	0.737 (-0.343)	n.s.
			MGU:	13	0.883	0.132		
	Device level (data)	Compliant data usage on private IT devices: different btw. laissez-faire and middle ground	LFU:	22	0.496	0.326	0.617 (-0.506)	n.s.
			MGU:	7	0.570	0.386		
	Compliant data usage on professional IT devices: different btw. laissez-faire and middle ground	LFU:	2	0.850	0.000	0.011 (2.972)	supported	
		MGU:	14	0.546	0.383			

Table 4. Case Results

### 5.4 Limitations of Quantitative Findings

Our paired multi-level case study approach bears several limitations that merit consideration when interpreting these quantitative findings. First, the purposeful sampling of two university cases may have introduced biases that this study cannot control for. For example, both cases under consideration had relatively different demographic characteristics. Second, the relatively small sample sizes on both user and device level data may have limited the power of the statistical tests. Third, our collection of self-reported data through face-to-face interviews may have introduced further biases. Fourth, all participants of the structured interviews were researchers at the Business School, which limits the generalizability to other university employees as well as to other types of organizations.

## 6 DISCUSSION AND COMPLEMENTARY QUALITATIVE FINDINGS

This paper was motivated by the question if and how different IT consumerization strategies affect the employees' level of compliant device usage. To substantiate our quantitative insights, this section discusses the findings from the hypotheses tests along with relevant qualitative findings.

### 6.1 Individual Level Attitudes

We drew on PJT to hypothesize the association between the IT consumerization strategy and the understanding for the usage policy. H1 was supported, meaning that MGU employees stated to have a considerably higher understanding for the usage policy (M=4.670) compared to employees at the LFU (M=3.870). According to PJT, organizations that ensure a fair policy development and actively communicate the policies achieve a higher level of understanding, which we confirmed in a university context. For example, one interviewee at the MGU stated: "I know that there is a guideline that I have

signed” (Interviewee 7, MGU) and another showed understanding for the usage policy: *“The problem is sensitive data, for example student grades or data from research projects [...]; the university maybe wants to retain control [...] because in the end it redounds upon the university”* (Interviewee 1, MGU).

In contrast, employees at the LFU experienced a lack of information and transparency with respect to the policies: *“No, [the policies] are not well communicated”* (Interviewee 6, LFU) or Interviewee 3 was wondering: *“if there are flat rates, then why is it still prohibited according to the guidelines to use the device privately?”* Hence, we found strong evidence that in the context of our study, the understanding for the usage policy is higher under a middle ground strategy and lower under a laissez-faire strategy due to a higher level of information and communication of the policies. In this respect, PJT seems to be an adequate lens to provide explanations for the association of the IT consumerization strategy with the understanding for the usage policy.

Hypothesis 2 was also supported by our quantitative analysis of the two universities, i.e., the satisfaction with the purchasing policy was lower under a middle ground strategy and higher under a laissez-faire strategy. Employees at the LFU were on average more satisfied with the purchasing policy (M=4.20) than employees at the MGU (M=3.13). In line with transaction cost inspired reasoning, the costs associated with compliance seemed to have strong influence on an individual’s behavior. The academic staff at the LFU appreciated to be unrestricted in their choice of IT devices, even if this implies to purchase the devices privately: *“I prefer to be able to choose. Receiving a device often means that you are restricted and could only get selected devices”* (Interviewee 6, LFU). This coincides with the study conducted by Harris et al. (2012), which showed that employees endorse the freedom of choice with respect to consumer-originated IT devices.

In contrast, the limited selection of the MGU catalog caused criticism: *“It is a very limited catalog, very limited. I got mine [IT device] as an exception”* (Interviewee 2, MGU). In addition, employees at the MGU complained about the bureaucratic effort for acquiring an IT device: *“I study gadgets and technology [...]. So it is very limiting and bureaucratic to get any of the other devices that I would like to purchase”* (Interviewee 7, MGU). The comments of the employees support the TCT arguments. Employees face a tradeoff between accepting an inconvenient solution or deviating from the policies by purchasing IT devices for professional purposes privately (Zimmermann & Rentrop 2014). The IT consumerization strategy is strongly associated with the satisfaction with the purchasing policy.

In sum, we find support for a seemingly paradoxical situation, where a middle ground strategy that aims to accommodate user needs and subsidizes consumerized IT devices is better understood from a procedural viewpoint, but fails to achieve its intention to improve user satisfaction. We found a reason for this discrepancy in the restrictions and efforts that these strategies entail. In other words, employees seem to value the freedom of choice with respect to IT devices more than dealing with potentially complicated internal procedures. Thus, the common procedural perspective on the organizational policy phenomena (Colquitt 2001; Korsgaard et al. 1995; Lind et al. 1993; Thibaut & Walker 1975) may be complemented by a transaction cost view (Winkler & Benlian 2012; Zimmermann & Rentrop 2014), which captures the peculiarities of dealing with IT consumerization policies.

## **6.2 Device Level Usage**

We developed two alternative hypotheses on the association between the IT consumerization strategy and compliant device usage: While PJT suggests that higher understanding would lead to a higher level of compliance (H3a), the TCT inspired view suggests that lower costs of compliance, reflected in a high user satisfaction, result in a higher level of compliance (H3b). Given the support for H1 and H2, PJT would thus see higher policy compliance under a middle ground strategy whereas TCT would see higher policy compliance under a laissez-faire strategy.

We tested this association separately for private and professional IT devices in a university context and differentiated three usage types (voice, email, and data). Our main finding is that for two usage types of professional IT devices (voice and data), the mean compliance index is significantly higher at

LFU (0.973, 0.8500) than at MGU (0.682, 0.5457). Thus, from the statistical results, we find partial support for the transaction cost view (H3b), indicating that compliant usage of professional devices is the result of a situation where it is just 'easy' for an employee to comply with laissez-faire policies – even if these policies are not designed in a particularly understandable or favorable way for the employee. The strong variation of the values may also be influenced by the unilateral distribution of devices types. At the LFU, primarily landline phones are used as professional devices while at the MGU the majority of the corporate IT devices are smartphones. Hence, the high compliance at LFU is likely influenced by the stationary character of the landline phones, which might be less attractive for private use. In this sense, LFU's laissez-faire policy makes it easier to comply with because it simply does not subsidize consumerized IT devices.

As opposed to this, the middle ground strategy at the MGU seems to fail to facilitate compliant IT usage of professional devices. Although MGU employees have the opportunity to purchase corporate IT devices from their research account, only half of the smartphones in the sample (8/16) are professionally purchased. One reason for foregoing the opportunity of purchasing corporate devices from the research account is the inconvenience to have two smartphones: *"I don't agree to the concept of two phones. So I will never have two phones"* (Interviewee 6, MGU). Interviewee 7 confirmed: *"So, for me it is easier to have one device only rather than two."* Interviewee 13 had a special way of using the work phone during vacation: *"If I go on a vacation and I don't do any work, I simply change the SIM."* Some employees also prefer to spend the money on their research account differently than on corporate phones: *"I'm very clearly aware that [...] the research account is also for me to go to conferences etc.. So, if money runs out, it runs out from me"* (Interviewee 7, MGU). These statements corroborate the transaction cost view by showing that, with regard to the use of professional devices, employees at the MGU are mainly concerned about the costs of compliance.

In terms of private device usage, we found no significant differences between LFU and MGU regarding the average policy compliance. We do find, however, strikingly low levels of compliance for email and data usage on private devices when looking at the data descriptively (email: LFU 0.312, MGU 0.267; data: LFU 0.496, MGU 0.570). Thus, the private devices of LFU and MGU employees are used more than 70 percent of the time for corporate email, and around half the time for professional data. While surprising at first, this finding can be related to the increasing blurring of boundaries between work and private life (e.g., Köffer et al. 2014; Schalow et al. 2013). However, our distinctive look at IT consumerization policies from two alternative theoretical perspectives suggests that employees at LFU and MGU might blur these work-life boundaries for different reasons: Employees at the laissez-faire organization use private devices for professional purposes, because their institution simply does not supply them with corporate mobile devices; employees at the middle ground organization do so because their organization's policies are too complicated to deal with. One comment at the MGU hints into this direction: *"My problem is that when I know these rules and when I use it [professional smartphone] both for private and business purposes, I don't want people to investigate. [...] So actually it is easier to have it private instead of mixing it with the organization"* (Interviewee 14, MGU).

## 7 CONCLUSION

Motivated by the pervasive IT consumerization trend, this research addresses the question of how different IT consumerization policies affect employee attitudes and policy compliant usage behavior. Our results from a paired mixed methods study of two university cases are twofold.

First, we found quantitative and qualitative evidence showing how the different strategies affect employees' attitudes. The PJT perspective was confirmed suggesting that middle ground strategies lead to a higher understanding of the policies due to better communication (H1). At the same time, we also found support for a TCT perspective implying that laissez-faire strategies can lead to a higher level of satisfaction due to lower costs of compliance (H2). These findings suggest a paradox where middle ground strategies are better understood, but do not yield their intended user satisfaction

benefits. We, therefore, argue that the transaction cost inspired view, which has already been used to explain other user-driven IT phenomena (e.g., Winkler & Benlian 2012; Zimmermann & Rentrop 2014) also serves as a valuable lens to explain compliant behavior and thus extends the more common procedural justice view on IT consumerization (e.g., Colquitt 2001; Putri & Hovav 2014).

Second, we traded these two theories off against each other to explain policy compliant usage of IT devices. Here, we obtained more nuanced insights: Compliant usage of voice and data on professional devices – mostly fixed landline phones – is significantly higher at the laissez-faire organization and lower in the middle ground case (H3b). Qualitative comments corroborated the view that costs of compliance (i.e., individual transaction costs) are the major reason for not complying with the policies for professional device usage in the middle ground case. In this regard, TCT can be seen as the preeminent lens to explain policy compliant (or non-compliant) professional device usage.

Compliant usage of private devices, however, is comparable and strikingly low across both cases. One explanation might be that in a university context there are other reasons outside the scope of this study that explain consumerization-driven work-life blurring (e.g., Köffer et al. 2014; Schalow et al. 2013). Yet, our qualitative data reveals that users under a middle ground strategy, who do understand the policies well, bypass them deliberately to avoid non-compliant usage of professional devices. In other words, non-compliant (i.e., private) use of professional devices is perceived more negatively than non-compliant (i.e., professional) use of private devices. Thus, understanding the effect of an IT consumerization policy on compliant behavior as a causal chain – e.g., from the formulation of a middle ground strategy, to the users' understanding of this policy, increased compliance cost, decreased satisfaction, and the move (back) to the use of private devices for work purposes – also helps us resolve the apparent paradox on the PJT and TCT lenses. PJT and TCT might thus be regarded as sequentially complementary theories, rather than as competing ones, to explain the effects of different IT consumerization policies on compliant usage behavior.

IT leaders can learn from our study that it is not sufficient to accommodate the emerging IT consumerization trend by simply providing a gadget budget and a catalog for employees to choose from (Harris et al. 2012). Middle ground strategies need to be designed in a way that facilitates their acceptance and minimizes the cost of their implementation. As we learned from our study, convenience (e.g., carrying one versus multiple mobile phones) plays an important role in a university setting, where researchers are used to blur work-life boundaries. In this setting, the MGU's middle ground strategy even led to a greater compliance and security chaos with all kinds of unforeseen forms of device usage, such as using professionally purchased devices with private SIM cards and vice versa. In a corporate setting, clearer communication and stricter policy enforcement may be countermeasures that IT leaders might consider in order to retain (or regain) control over consumerized IT devices.

Future work in this emerging IS research area might deal with the effects of cultural differences and, besides addressing the methodological limitations, also aim to achieve generalizability beyond the context of universities. The applied mixed methods case study approach and the two mutually complementing theoretical lenses may provide a good foundation for future IT consumerization research.

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