Are Employees Following the Rules?
On the Effectiveness of IT Consumerization Policies

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Abstract. In most organizations, employees commonly use mobile technologies including smartphones and tablets to complete their tasks. Therefore, many organizations have started to implement policies that govern the use of mobile devices such as Bring-Your-Own-Device (BYOD) policies, that allow employees to use private devices for work-related purposes, or Company Owned Privately Enabled (COPE) policies, which allow the use of organizational technologies for private purposes. Despite its relevance, there is only little empirical research that provides evidence on the effectiveness of specific policies, i.e., policies in favor of BYOD/COPE, policies that prohibit it, and no implemented policies. Based on survey data ($N = 381$), we provide initial insights in terms of the effectiveness of these policies. Our results indicate that policies indeed influence the degree of technology use. Policies in favor of BYOD/COPE are particularly effective. We conclude this paper by discussing our findings and derive several implications for theory and practice.

Keywords: IT Consumerization, BYOD, COPE, policies

1 Introduction

In modern organizations, it has become common practice for employees to use their personal technological devices or applications for job-related tasks. This use of consumer IT in the workplace, also known as "IT consumerization", represents a significant change in contemporary work life and has different benefits such as increased innovation, enhanced productivity, and a higher level of employee satisfaction [1]. A maturing body of knowledge has contributed to a better understanding of this development by investigating specific antecedents of IT consumerization [2] and its effects [3].

Although literature on IT consumerization has matured, it hardly investigates organizational aspects. This gap becomes most evident with regard to the effects of policy implementation and its impact on use behavior (see for instance [4]). From a practical perspective, this shortcoming is quite significant because policies are powerful instruments that allow organizations to influence their employees' use behavior (e.g., [5]). Therefore, it is important to provide empirical evidence on the usefulness and

effectiveness of policies to derive implications and consult with organizations. Since there are two dominant options, namely Bring Your Own Device (BYOD) strategies [6] and Company Owned Privately Enabled (COPE) strategies [7], which are both equally important for organizations, a detailed analysis of their effectiveness would be most beneficial. Against this background, we seek to address this aspect with the following research questions (RQ):

RQ 1: How effective are policies in enhancing/reducing device use behavior?
RQ 2: Is there a difference between the effectiveness of BYOD and COPE policies?

In order to address our research questions, this paper is structured as follows: first, we review existing literature on IT consumerization to identify existing knowledge on the effects of policies in this field (section 2). Based on our review, we propose a research model that addresses this issue by hypothesizing differences in terms of policies and their impact on use behavior (section 3). In Section 4, we describe our methodological approach to address our objective. Thereafter, we present our analysis and the results (section 5). We discuss our findings in Section 6 and conclude by reflecting on the limitations of our study and by providing impulses for future research (section 7).

2   Related Work on IT Consumerization

Today, it is common practice to use privately-owned technologies for work-related tasks or to use company-provided IT for private purposes. The blend of personal technological devices or applications and business IT is described as "IT consumerization" or "consumerization of IT" [8]. This development comes with distinct strategies that allow organizations to monitor this phenomenon: BYOD and COPE. While BYOD refers to employees' work-related use of private hardware devices (such as personal laptops, smartphones, or tablets), COPE refers to the personal use of corporate IT. A typical example of COPE is the dual use of company-provided technologies such as smartphones for professional and private communication. In contrast, using a privately-owned smartphone for both purposes is considered BYOD.

Literature on IT consumerization acknowledges the multiple perspectives on this phenomenon. For example, Harris et al. [1] and Köffer et al. [6] refer to three perspectives, namely the individual, the organizational and the market perspective. The individual perspective refers to how an individual handles personal IT that is brought to work and is used for work-related purposes [1]. The individual perspective on IT consumerization thus focuses on the ownership of an IT tool [6]. The organizational perspective on the other hand deals with governing the use of such private IT in official business settings. From this point of view, IT consumerization can be seen as both a threat and an opportunity [1]. Finally, the market perspective on IT consumerization focuses on the origin or target market of consumer IT [1]. This third perspective highlights that consumer market technologies gradually reach enterprises, thereby having an impact on the IT department and preventing the distinction between

consumer and enterprise IT [6]. It is worth noting that those perspectives overlap and influence each other.

In order to identify literature that addresses our research questions, we conducted a structured literature review [9, 10]. We started with the Web of Science by searching for "IT consumerization" within the senior scholar basket of eight [11]. Moreover, we manually scanned the forthcoming section of each journal. This means that most current publications [12, 13] are also considered here. Since the initial search did only reveal two studies, we further consulted the AIS library, which yielded in 24 papers. Note that the search was conducted by means of a keyword search in the abstract without limitations regarding the publication year. Each of the 26 papers was read by at least one of the authors and classified into one of the three perspectives. We specifically took all research questions, the research design, and the data sample into consideration and analyzed the unit of analysis. Since the three perspectives are not distinct (i.e., they overlap), we used the dominant perspective as a criterion to which we assigned each paper. An overview is given in Table 1.

For instance, Junglas et al. [13] seek to "examine the effect of IT consumerization on innovative work behaviours" (p. 2). Since the main focus lies on the individual, we included this study in the individual perspective. Similarly, we included research that investigates the change of governance structures [12] in the organizational section. Studies that examine the market perspective such as Niehaves et al. [8] ("[w]hat areas of information systems are specifically affected by consumerization", p. 2) were categorized accordingly.

Table 1. Related work on IT Consumerization

Perspective	Focus	Typical research question	References
Market	"Origin or intended target market of the IT tool" ([6], p. 366)	"What areas of information systems are specifically affected by consumerization?" ([8], p. 2)	[8]
Individual	"Ownership of the IT tool" ([6], p. 366)	"Why do some employees choose novel and innovative consumer IT on their own while others continue to work with the existing enterprise IT?" ([14], p. 1)	[2, 3, 6, 13–23]
Organizational	"Permission to use private IT tools for work" ([6], p. 366)	"What conflicts does IT consumerization create for IT departments?" ([24], p. 4)	[1, 4, 12, 24–31]

Our review highlights that the primary focus of research on IT consumerization lies on the individual perspective, whereas the market perspective only seems to play a minor role. This indicates that the origin of an IT tool, which is the focal point of the

market perspective, is not of crucial importance in current literature anymore. This trend seems rather natural due to the pervasive nature of consumer technologies today. In turn, this makes the distinction between consumer market and business market less important. Our review also shows that, while the organizational perspective on IT consumerization has expanded in general, there is not yet a lot of literature that addresses the subject of policies. If at all, policies in relation to IT consumerization are of secondary importance in the reviewed literature. Notable examples include a study conducted by Lüker et al. [4] who make an important contribution to the field by investigating the importance of IT consumerization policies. Similarly, Mokosch et al. [28] study how organizational structures affect individual behavior. This lack of research is very significant because policies are a fundamental aspect of workplace design and, therefore, influence individual behavior. Without empirical evidence that provides further insights into this relationship, it is challenging to justify the implementation of such policies. Against this background, we seek to expand existing knowledge on the role of policies by investigating the impact of different types of policies on individual use behavior based on a large empirical sample. Our underlying research model is proposed in the following section.

3　Research Model

It is commonly accepted that external factors such as organizational factors including policies have a major impact on technology use. This is a fundamental assumption in the technology acceptance literature (e.g., [32]) and has also been emphasized in literature on mobile devices [28, 33]. The link between policies and individual behavior has also received support in various fields. For instance, Richman et al. [34] show that there is a significant relationship between supportive work-life policies and an employee's engagement. Similarly, Moskowitz et al. [35] highlight that workplace smoking policies result in employees smoking less.

Surprisingly, in related literature on IT Consumerization, the link between policies and use behavior is somewhat ambiguous. On the one hand, there is an increasing amount of literature that shows that employees use their devices despite it being prohibited or at least not approved. This trend is commonly referred to as shadow IT (e.g., [36]). In fact, existing research suggests that individuals who seek to meet their job performance expectations willingly neglect IS policies [37]. Based on this stream of research, we can assume that policies might not yield the intended degree of effectiveness. On the other hand, current literature provides evidence that the type of policy indeed has a significant effect on use behavior. For example, Junglas et al. [13] show a significant relationship between permission to use and intended use behavior.

In order to investigate the impact of different policies in detail, we propose a research model that explicitly differentiates between three distinct types of policies: policies that allow BYOD/COPE, policies that prohibit BYOD/COPE, or a lack of policy (i.e., no policies are implemented).

Policies that allow BYOD/COPE. We generally assume that policies allowing BYOD/COPE have a positive impact on use behavior. This is in line with existing literature on IT Consumerization (e.g., [13, 28]). We specifically assume that a policy that is in favor of BYOD or COPE has a positive impact on the corresponding degree of technology use. In fact, current literature suggests that permission to use private technology at the workplace has a significant impact on the individual's decision to actually use it [13]. We assume that this relationship is stronger when organizations have a policy in place that is in favor of BYOD/COPE rather than lacking such a guideline. Therefore, we propose the following hypotheses:

Hypothesis 1a: A policy that allows BYOD leads to a higher degree of (private) device use (for work-related purposes) than a lack of policy.

Hypothesis 1b: A policy that allows COPE leads to a higher degree of (company-owned) device use (for private purposes) than a lack of policy.

In line with hypothesis 1a and 1b, we assume that there also is a significant difference between organizations that allow BYOD/COPE and organizations that prohibit it. Therefore, we hypothesize the following:

Hypothesis 2a: A policy that allows BYOD leads to a higher degree of (private) device use (for work-related purposes) than a policy that prohibits BYOD.

Hypothesis 2b: A policy that allows COPE leads to a higher degree of (company-owned) device use (for private purposes) than a policy that prohibits COPE.

Policies that prohibit BYOD/COPE. Based on the IT consumerization literature that investigates the prevention of security threats and non-compliant behavior (e.g., [4, 38]), prohibition policies are of major interest. Those studies suggest that awareness of prohibition policies as well as the possible cost of noncompliance effectively decrease the use of technology. This is also in line with more general literature on security compliance relating to deterrence theory. This theory suggests that the higher the cost of noncompliance (e.g., sanctions, privacy concerns), the more likely it is that employees comply with given policies (e.g., [39, 40]). Contrary to this assumption, literature on shadow IT proposes that employees tend to be pragmatic and care more about their job performance than about complying with IS policies [37]. Those types of behavior can be explained by the neutralization theory, which suggests that people use neutralization techniques to legitimize their misbehavior [41]. For instance, Silic et al. [42] show that the neutralization technique "metaphor of ledger" has a strong and positive effect on policy violation in the context of shadow IT. This technique is based on the idea that we compensate bad behavior (e.g. violating the policy) with good behavior (e.g., overtime) [42]. Considering both streams of research, we argue that the existence of a prohibition policy has a stronger effect than a lack of policy. Hence, we propose the following:

Hypothesis 3a: A policy that prohibits BYOD leads to a lower degree of (private) device use (for work-related purposes) than a lack of policy.

Hypothesis 3b: A policy that prohibits COPE leads to a lower degree of (company-owned) device use (for private purposes) than a lack of policy.

Combining the arguments mentioned above, we propose a model that compares different relationships between policies that govern different types of use behavior and the actual use (cf. Figure 1).
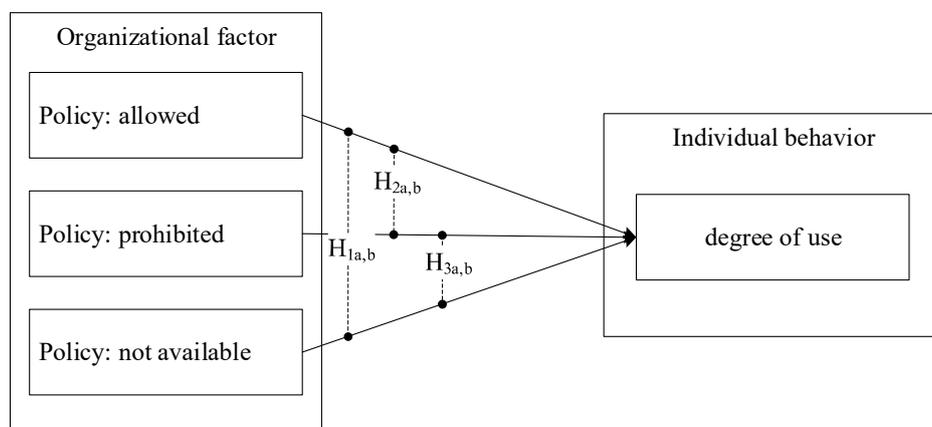

Figure 1. Research model

4   Methodology

This study is part of a larger project on IT consumerization and its impact on organizations. The focus of this study is related to the role of organizational policies and how they affect individual behavior. We collected data from 400 employees using computer-assisted telephone interviews (CATI). The participants were recruited from different local administrations in Germany that ranged from less than 50 employees up to 10,000. In order to create a representative sample, we selected 400 administrations out of the overall administration population. Responses with missing values relating to policies or use behavior were excluded, which yields 381 usable observations for this study. Table 2 provides a summary of the demographics. To measure the perceived skill in terms of technology use, the participants rated their IT skills ("How would you rate your IT skills…") on an ordinal scale ranging from "beginner" to "competent user" to "expert".

Table 2. Demographics, $N = 381$

Dimension	Classification	Percentage
	20-39	21.3%
Age	40-60	61.2%
	Older than 60	11.5%
	n/a	6.0%
Gender	male	67.4%
	female	32.6%
	beginner	20.5%
Skills	competent user	60.1%
	expert	19.1%
	n/a	0.3%

Whenever possible, we used established measurements. For BYOD and COPE use, we applied the device-related dimension of an established scale [2][1]. In terms of policies, we adopted an existing categorical [2] including "not allowed", "allowed", "missing". An overview is given in Table 3:

Table 3. Measurement Items

	Variable	Adapted Item	Scale	Source
BYOD	Use	I use private devices (e.g., laptop, smartphone) to complete work tasks.	7-point Likert scale	(adopted from [2])
	Policy	In my organization, the use of private devices to perform work tasks is …	"not allowed", "allowed", "missing"	(adopted from [13])
COPE	Use	I use the devices provided by the organization (e.g., laptop, smartphone) to complete private tasks.	7-point Likert scale	(adopted from [2])
	Policy	In my organization, the use of devices provided by the organization to perform private tasks is …	"not allowed", "allowed", "missing"	(adopted from [13])

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[1] We also computed the analysis with the complete scale, including the use of internet accounts and the use of software [2] with sum scores. Since the results did not yield significantly different results, we only use one item for the subsequent analysis. Therefore, it is more in line with the objective of this study.

5   Data Analysis and Results

In order to investigate the hypotheses, the data analysis for each policy (i.e., BYOD and COPE) was conducted in three consecutive steps.

First, we applied a multiple regression in order to identify possible confounding factors. Therefore, we included gender, age, and skills as possible factors (i.e., predictors) of use in our regression models because these are commonly included in use-related research (e.g., [43]). The results of the BYOD regression model are significant in that they predict use and show that the three predictors account for 2.5% of the variance, $R^2 = .025$, $F (3, 375) = 3.216$, $p < .023$. We found no significant predictive power for the coefficients of age, $\beta = .063$, $p = .223$, and skills, $\beta = .057$, $p = .261$. However, the data shows that gender is significant, $\beta = -.124$, $p < .016$. The regression for COPE yielded similar results. The regression model shows that the three predictors account for 4.3% of the variance, $R^2 = .043$, $F (3, 377) = 5.666$, $p < .001$. Age, $\beta = .022$, $p = .663$, and skills, $\beta = -.021$, $p = .679$, do not significantly predict use while gender contributes to the model significantly, $\beta = -.020$, $p < .001$. Thus, the results indicate that gender has a confounding effect. Consequently, we include gender in our consecutive analysis.

Second, to analyze the effects of policies on the use of consumer IT, we applied an analysis of covariance (ANCOVA) including gender as a covariate. Table 4 shows the results that indicate a significant effect of BYOD policy on BYOD use after controlling for gender, $F (2, 377) = 13.93$, $p < .001$.

Table 4. ANCOVA results and Descriptive Statistics for BYOD Use by Policy and Gender

Type of Policy	BYOD Use			
	M	Adj. *M*	*SD*	*n*
Use prohibited	1.91	1.89	1.61	138
No Regulation	2.26	2.28	1.76	172
Use allowed	3.21	3.21	1.90	71
Source	*SS*	*df*	*MS*	*F*
Gender	24.44	1	24.44	8.26*
Policy	82.42	2	41.21	13.93**
Error	1115.58	377	2.96	

*Note. *p < .01, ** p < .001*

Similarly, Table 5 shows the significant effect of COPE policy on COPE use after controlling for gender, $F (2, 377) = 17.43$, $p < .001$.

Third, due to the statistically significant results, we carried out post hoc comparison analyses using Tukey's honestly significant difference (HSD) test to further examine the differences between the policies. For BYOD, the post hoc Tukey tests show that the "use allowed" policy ($M = 3.21$), no regulation ($M = 2.26$) and the "use prohibited" policy ($M = 1.91$) differ significantly at p < .01; the "use prohibited" policy and "no regulation" were not significantly different (see Figure 2). For COPE, the post hoc Tukey tests yield similar results. The "use allowed" policy ($M = 2.49$) differs significantly at p < .01 compared to "no regulation" ($M = 1.63$) and the "use prohibited"

policy ($M = 1.40$); the "use prohibited" policy and "no regulation" were not significantly different (see Figure 2).

Table 5. ANCOVA Results and Descriptive Statistics for COPE Use by Policy and Gender

Type of Policy	COPE Use			
	M	Adj. *M*	*SD*	*n*
Use prohibited	1.40	1.41	1.11	195
No Regulation	1.63	1.64	1.21	116
Use allowed	2.49	2.43	1.64	70
Source	*SS*	*df*	*MS*	*F*
Gender	19.43	1	19.43	12.81**
Policy	52.88	2	26.44	17.43**
Error	571.91	377	1.52	

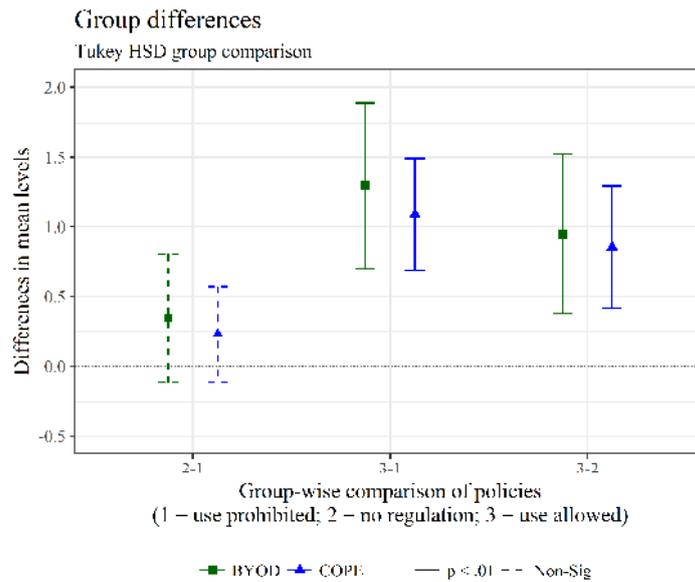*Note. *$p < .01$*, ** *$p < .001$

Figure 2. Group-wise differences

6   Discussion

Overall, our results indicate that BYOD and COPE policies can be compared in terms of their impact on individual use behavior. Therefore, our results hold for both types. We do recognize small differences between BYOD/COPE regarding their mean levels.

Specifically speaking, the differences between COPE policy groups are smaller than the differences between BYOD policy groups (see Figure 2). This indicates that the effect of BYOD policies is slightly stronger in terms of absolute values. We also conclude that the use of private devices for work related tasks (BYOD) is more common than using company owned devices for private purposes (COPE). In comparison, each BYOD policy type (i.e., "use prohibited", "no regulation", "use allowed") has a higher mean use than COPE policies (see Table 4 and Table 5).

The results also suggest that the hypotheses that a policy that allows BYOD/COPE leads to a higher degree of device use than a lack of policy (H1a, H1b) or a policy that prohibits BYOD/COPE (H2a, H2b) can both be supported. Thus, we can conclude that the implementation of policies in favor of using technology is an important tool for organizations to promote use. However, H3a and H3b, which are proposing that a policy that prohibits BYOD/COPE yields a lower degree of use compared to a lack of policy have to be rejected because no significant differences were detected. This does not necessarily imply that policies that prohibit use are not effective. Based on our data, this is rather due to a generally low level of use (BYOD – M: 1.91; COPE – M: 1.40). Consequently, we argue that no regulation reduces device use. As hypothesized in H1a and H1b, perceived risks may have an influence on whether a device is used or not in the case of no regulation. Since our findings were focused on the overall effect of policies and not on the individual antecedents of device use, we did not measure those factors. But we believe that those perceived risks are a valid explanation for these results.

Based on our insights, we derive several implications for theorizing. Most importantly, our results suggest that there are situations where there are no differences between an implemented policy and a lack of policy. Against this background, existing IT consumerization studies on policies could be examined in more detail. For instance, Lüker et al. analyze a compliant behavior related to different specified prohibition policies (loose vs. strict) [4]. Since they do not explicitly distinguish between a lack of policy and prohibition policies, their research can benefit from our results. Similarly, Junglas et al. show that policies have a significant impact on IT consumerization behavior [13]. Again, their study could be further expanded by investigating different types of policies.

Since the primary objective of this study is to investigate the effectiveness of different policies, this research has important implications for organizations. Most importantly, this study provides empirical evidence that the implementation of policies is effective. Therefore, organizations that are interested in increasing (or decreasing) their staff's use behavior (such as BYOD) can implement policies that follow their intended strategy. This is also in line with previous literature that investigates the relationship between organizational structures and individual behavior [28].

Based on our results, there is no significant difference between policies that prohibit use and a lack of policy. Hence, if organizations want to benefit from advantages related to consumer IT (e.g., innovation behavior [6] or performance [3]) they should implement policies that explicitly allow the use of private devices.

7   Conclusion, Limitations and Outlook

Based on a comprehensive review of the IT Consumerization literature, this paper addresses a gap by examining the effectiveness of distinct BYOD and COPE policies. The results show that policies generally are an important tool to influence the degree of use regarding BYOD and COPE. Above all, they highlight that if an organization is interested in benefitting from consumer IT (e.g., innovation behavior [6] or performance [3]), they should implement policies in favor of BYOD and COPE.

Not unlike any other study, this piece of research has its limitations, which, in turn, opens the door for future research. First, our results suggest that devices are used rather sparingly (see mean values). A possible explanation for this is our sample. In fact, there is a high proportion of older people (see Table 2). Since literature on digital divide suggests that older people play a pivotal role (e.g., [44]), future research should shed further light on the role of age. Second, this research builds on survey data. Based on our findings, further research could extend these efforts in terms of field experiments in order to go beyond self-reported indications. Third, our literature analysis is based on previous work on "IT Consumerization". However, there is more literature available that can be included by extending the keywords. For example, "Individual Information Systems" can be included to get a more comprehensive overview. Fourth, there might be situations where organizations force their employees to use private IT (e.g., gig economy). Hence, future research should also investigate how enforcement affects the degree of individual use behavior. Finally, the role of policies may differ across specific groups. Therefore, we suggest to further investigate this topic by acknowledging group differences such as industry versus government or large organizations versus small and medium sized enterprises.

8   Acknowledgements

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