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Eye of the Blamestorm: An Exploration of User Blame Assessment within Compound Digital Platforms

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ABSTRACT

More and more IS-enabled technologies are being used within the context of ecosystems that include both hardware and software components that act together as a central platform; we term these ecosystems digital compound platform ecosystems. However, given the interconnectedness of components within these platforms, if an ambiguously sourced failure occurs within one of these ecosystems, users may blame and/or take action against components in the ecosystem that were not actually at fault. This study considers antecedents of both blame and discontinuance intent within such ecosystems given a system failure of ambiguous origins. We test manipulations for border strength, goal directedness, and resolution duration to understand their impact. We find that all three of these manipulations have an effect on user assessment of blame and discontinuance intent. Further, we establish that blame is not a required condition for discontinuance intent to occur.

Keywords

Digital platform ecosystems, compound platforms, human-computer interaction, blame, digital borders

INTRODUCTION

More and more information technology systems are encountered within the context of a platform ecosystem. Smartphone applications, for instance, run within a given operating system (OS) that runs on a given hardware device (the handset). System failures have been shown to have a negative impact on the perceptions and intents of users (Tan et al. 2016). It is unknown, however, how a system failure of ambiguous origin affects the various components of platform ecosystem that are working together. This research pursues two related research questions: (1) given an ambiguous-source system failure, how do users determine the diffusion of blame among system components and what effect does this blame have; and (2) how can components within such systems reduce the negative implications for such failures?

BACKGROUND

Platform ecosystems as presented in the IS canon (i.e., Tiwana et al. 2010) are considered to have two types of components: a software platform and modules that make use of that platform. The concept of platform ecosystems is based on earlier economics-focused studies of platform and two-sided markets (e.g., Armstrong 2006; Eisenmann et al. 2006; Rochet and Tirole 2003), which includes the concept of multilayer platforms, where one side of a platform is itself another platform (MacCrory and Shivendu 2013). To provide a fitting context for our study, we introduce the idea of the *compound digital platform*, in which multiple components together (e.g., the smartphone and the operating system) act as a single platform across which adopters (e.g., consumers, application developers) interact. Further, these compound digital platforms give rise to *compound digital platform ecosystems*, which consists of these platforms as well as the modules that use them.

Our questions also require an understanding of blame. In this research, *blame* is considered a negative judgment or evaluation by an individual of a given agent based on its performance (Tognazzini and Coates 2014). Further, in order for blame to occur, the target agent must be considered blameworthy, meaning that the agent to be blamed must be considered responsible for its actions (Smart 1961), and not, for instance, acting against its will or without the ability or understanding to perform differently.

HYPOTHESES AND RESEARCH MODEL

To understand how components in a compound digital platform ecosystem may reduce the negative impact of blame, we adapt the concept of *border strength* (Dunn et al. 2015), which refers to the extent to which a transition among "locations" (e.g., components) is made prominent. For instance, in a smartphone ecosystem, the OS might strengthen its border (i.e., more strongly delineate itself from the hardware and application) by including a splash screen on start-up or providing messaging regarding the transition to an open application. This concept, applied to the Web context, has been shown to affect a user's willingness to credit a location for its contribution to a completed task. We therefore expect that it will also affect user assignment of blame (Hypothesis 1a) and intentions toward components of a compound digital platform ecosystem (Hypothesis 1b) given an ambiguous-source failure.

Next, there are potentially many conditions that might affect how an individual assigns blame to components in a compound digital platform ecosystem given an ambiguous-source system failure. In this research, we consider two of these. First, we consider the task being performed by the user. Tasks may be considered more or less *goal-directed*, which refers to the extent to which a task is clear, understood, and addressable (Hoffman and Novak 1996). This concept of goal-directedness has been shown to significantly relate to differences in user perceptions and intents related to information systems, in particular regarding perceived pleasantness (Deng and Poole 2010), user satisfaction (Nadkarni and Gupta 2007), and flow (Novak et al. 2003). We therefore expect that the goal-directedness of a task being completed within a compound digital platform ecosystem will significantly affect the amount of blame assessed the component (Hypothesis 2a) and intent toward the component (Hypothesis 2b).

Second, we also consider the resolution duration required after the system failure (i.e., how long it takes to recover post-failure). Galletta et al. (2006) found that delay in a website context represented a form of cost, negatively affecting user intentions. Other studies have found it to negatively impact perceptions such as experience quality (Egger et al. 2012; Strohmeier et al. 2012), user frustration (Ceaparu et al. 2004), and system success (Palmer 2002). We therefore expect that the duration required to resolve problems caused by an ambiguous-source system failure will increase the amount of blame assessed (Hypothesis 3a) and affect the intent toward (Hypothesis 3b) components of a compound digital platform ecosystem after an ambiguous-source system failure.

Finally, to validate our use of the blame construct, we consider the relationship between blame and intent (specifically in this study, the intent to recommend discontinuance). Service failures have been shown to have negative consequences for websites where they have occurred (Tan et al. 2016). Further, a substantial literature has found significant relationships between negative perceptions of and future intent toward a technology (e.g., Lowry et al. 2013; Nah et al. 2011). Thus, we expect that the greater the blame assessed a component after an ambiguous-source failure, the greater the intent to recommend discontinuance (Hypothesis 4).

METHODOLOGY

These hypotheses were tested via a scenario-based experiment. Participants (n = 379) recruited via Amazon's Mechanical Turk were randomly selected into one of 12 experimental cells (3 border strength x 2 goal directedness x 2 resolution duration). Participants were then presented a scenario (specific to the appropriate cell) that described a situation in which they had been given a mobile digital system (smartphone + OS + application) that they were expected to use as part of a new job they were starting.

Border strength was manipulated by noting the names of the smartphone manufacturer, OS developer, and application developer and quizzing participants regarding these identities (high border strength conditions) or not mentioning the names at all and quizzing on unrelated matters (low border strength condition). We further sub-divided the high border strength conditions into a known app developer condition (using Oracle as the developer) and an unknown app developer condition (using an invented brand, Teleduke). Goal-directedness was manipulated by presenting a scenario in which the system was used to find examples of high-quality employee work as part of an awards nomination process (high goal-directedness) or instead surfing system content for (low goal-directedness). Resolution duration was manipulated by explaining in the scenario that, after the failure, it took the company's IT department three days to make the phone operable again (high resolution duration) or the phone needed to be restarted and was again usable thereafter (low resolution duration).

Following presentation of these scenarios, participants were then asked questions related to blame assessment given and intent to recommend discontinuance of each of the system components (phone, OS, app). Control variables were collected via survey prior to the presentation of the scenario and included susceptibility to interpersonal influence (Bearden et al. 1989), brand impression (Dodds and Monroe 1985), propensity to blame (a new construct), mobile self efficacy (a new construct developed from Barbeite and Weiss 2004), product involvement (Zaichkowsky 1994), and demographic information.

ANALYSIS

Two multivariate analyses of variance (MANOVAs) were then performed using border strength, goal-directedness, and resolution duration as independent variables. The first MANOVA included the level of blame assessed to the manufacturer, OS, app, and self as dependent variables. The second included the discontinuance recommendation intent for the manufacturer, OS, and app as dependent variables. In both MANOVAs, a priori brand impressions of the manufacturer, OS, and app brands, propensity to blame, mobile device self-efficacy, product involvement, susceptibility to interpersonal influence, gender, age, and education level were included as covariates. Also, to examine the effect of blame on discontinuance recommendation intent, the levels of blame were included as covariates in the second MANOVA. Descriptive statistics and significance are indicated for these two analyses in the tables below.

Treatment	Conditions	N	Mean Manufacturer Blame (SD)	Mean OS Blame (SD)	Mean App Blame (SD)	Mean Self Blame (SD)
Borders	Weak Border	124	3.78 (1.751)	4.64 (1.574)	5.96 (1.107)	2.86 (1.731)
	Strong Border – Teleduke	123	3.86 (1.554)	4.64 (1.499)	5.93 (1.146)	2.98 (1.635)
	Strong Border – Oracle	121	3.50 (1.699)	4.43 (1.632)	5.80 (1.222)	2.59 (1.493)
Goal Directedness	Experiential	185	3.63 (1.600)	4.57 (1.570)	6.00 (1.016)	3.14 (1.753)***
	Goal Directed	183	3.80 (1.743)	4.57 (1.570)	5.79 (1.280)	2.49 (1.421)***
Resolution Duration	Short Duration	183	3.47 (1.627)*	4.29 (1.565) ***	5.85 (1.174)	2.77 (1.553)
	Long Duration	185	3.96 (1.686)*	4.85 (1.525) ***	5.94 (1.143)	2.86 (1.701)

Table 1. Blame model mean values and (standard deviations). * $p < .05$, ** $p < .01$, *** $p < .001$. Effect of goal directedness on self blame in negative direction, other significant effects are positive direction.

Treatment	Conditions	N	Mean Manufacturer Continuance-Discontinuance (SD)	Mean OS Continuance-Discontinuance (SD)	Mean App Continuance-Discontinuance (SD)
Borders	Weak Border	123	4.04 (1.339)**	4.48 (1.276)**	5.59 (1.145)
	Strong Border – Teleduke	123	4.64 (1.466)**	4.07 (1.524)**	5.60 (1.122)
	Strong Border – Oracle	121	4.53 (1.461)**	4.28 (1.629)**	5.49 (1.239)
Goal Directedness	Experiential	184	4.33 (1.340)	4.36 (1.434)	5.56 (1.172)
	Goal Directed	183	4.48 (1.540)	4.19 (1.541)	5.56 (1.165)
Resolution Duration	Short Duration	182	4.30 (1.411)	4.18 (1.462)	5.34 (1.289)***
	Long Duration	185	4.50 (1.471)	4.37 (1.513)	5.77 (.990)***

Table 2. Discontinuance recommendation intent model mean values and (standard deviations). * $p < .05$, ** $p < .01$, *** $p < .001$. Effect of border strength on discontinuance recommendation intent for OS in negative direction, other significant effects in positive direction.

DISCUSSION

This paper provided a first exploration into user perceptions of individual components within a compound digital platform ecosystem within the context of an ambiguous-source failure. We examined how blame was assessed as well as how that blame affected user intent toward each of the components. In doing so, we have introduced and formalized the concept of the compound digital platform. This was necessary given that the interconnectedness of components within resulting ecosystems results in ambiguous responsibilities among them.

Although previous research has explored consequences related to IT system failure (Holloway and Beatty 2003; Tan et al. 2016), none to our knowledge has explored the effects of failure in platforms where the source of the failure is unclear. With the prevalence of such compound digital platforms, such ambiguous failures are likely to be recurring issues. Tables 1 and 2 suggest that apps bear more of the blame for failures than do components higher up in the stack (i.e., OS and manufacturer), even when the actual source of the failure is unknown. However, it is important to note that the OS and manufacturer are not absolved of blame. This implies that the failure of one component in the system, if not identified as the source, will have a negative impact on all components of the system.

Next, our data show that blame and discontinuance intentions are closely related, with the former related to an increase in the latter. However, we observed important differences between what leads to blame and what leads to discontinuance intentions. Discontinuance may occur without blame having first occurred. This finding corroborates the blame-related assertions of Smart (1961) in that users may not consider a component responsible enough to assess blame (e.g., the user may feel the component could not do anything about the situation), but may nevertheless prefer to discontinue use of that component.

We also find that while stronger borders significantly increased the discontinuance intent for manufacturers, they also significantly lowered it for the OS. In other words, when it was not pointed out a priori that the OS and smartphone were discrete entities, more blame was laid on the OS. This suggests that users may view the OS as the most central component of the platform and may therefore ignore the contribution (or faults) of the handset unless made clearer, for instance, by increasing the border strength between the two components.

From a practice standpoint, these findings highlight the importance of border strength. Given the shifting of discontinuance recommendation intent in the case of higher border strength away from the OS and toward the manufacturer, we suggest that OS developers should endeavor to more clearly delineate their product from that of the manufacturer by making it clearer to the consumer that both the hardware and OS play a role in the function of the device. Further, our results show that rapid resolution of system failures decreases blame assessed to the manufacturer and OS. This supports the idea of creating tight integration between hardware manufacturers and OS developers, which supports the strategy currently pursued by Apple in both manufacturing their own handsets as well as developing the OS.

FUTURE DIRECTIONS AND CONCLUSION

We note, of course, that there are some limitations to our findings. For instance, while we found significant main effects for border strength, our manipulation was very much simplified as a result of the scenario-based data collection approach. Other, real-world attempts at creating border strength may have different effects on the results and should be a subject for future inquiry. Similarly, our task-related construct (goal-directedness) is one of several possible taxonomies for describing tasks; others (e.g., task complexity) might yield more nuanced results. Finally, our data collection was based entirely on a scenario-based experiment in which participants had to pretend to have participated in the events described to them. While we found significant results, we expect that these results were dampened by the requirement to imagine the experience. Future research may find even more and more detailed results from an experimental or archival dataset based on actual failure experienced in fact by participants.

Nevertheless, our study has made significant contributions to the understanding of digital compound platform ecosystems. These configurations continue to grow in prominence for both organizations and consumers, despite the challenges presented by an increased level of interconnectedness among components. As such, we have introduced the concepts of the digital compound platform, blame, and propensity to blame into the IS canon to help in the study of such ecosystems. Our findings regarding the distribution of blame and its causes, as well as dynamics regarding user intent to recommend discontinuance are thus an important first step in understanding this growing form of system configuration.

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