



The Resilience Trio: Organisational Environment, Mutual Support, and Customer Involvement in Agile IT Project Teams

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Abstract

Background: In the face of escalating volatility and complexity, organisations increasingly turn to agile practices to bolster adaptability. Yet, agility alone does not guarantee that project teams will withstand prolonged disruptions or rapid market shifts.

Objective: This study investigates how the agile organisational environment shapes team resilience, examining both its direct impact and its indirect effects via mutual support and customer involvement within Moroccan Information Technology agile projects.

Methodology: Employing a quantitative cross-sectional design, data were gathered through a structured survey of 142 agile professionals. Constructs for the organisational environment, mutual support, customer involvement, and team resilience were adapted from established measures and rated on a seven-point Likert scale. Partial Least Squares Structural Equation Modelling (PLS-SEM) guided hypothesis testing underpinned by the Conservation of Resources theory.

Results: The findings reveal that a supportive and flexible agile environment markedly strengthens team resilience. This influence operates directly and is further amplified by enhanced peer collaboration, indicating that teams with strong mutual support recover more effectively from adversity. Additionally, engaging clients meaningfully provides another pathway to bolster resilience, though its effect is more modest than that of internal team dynamics. The combined model accounts for a substantial proportion of the variation in resilience among teams.

Conclusion: Cultivating an organisational climate that promotes collaboration, trust, and stakeholder engagement is vital for sustaining team performance under pressure.

Unique Contribution: By introducing customer involvement as an external resilience enabler, this study extends the agile project management literature and provides empirical evidence from an emerging-economy context.

Key Recommendations: Managers should actively foster mutual support structures within teams and integrate clients early in agile processes to reinforce resilience across projects.

Keywords: Agile project management; team resilience; organisational environment; mutual support; customer involvement.

Introduction

Nowadays, the environment in which companies operate is characterised by volatility, uncertainty, complexity and ambiguity. In such a context, teams face several challenges that can hinder their performance levels (Stoverink et al., 2020). A resilient team can thrive in an increasingly challenging environment while maintaining its performance levels. Alliger et al. (2015, p. 177) note that ‘teams in all business sectors face challenges; while these are rarely catastrophic, they are often severe enough to impair performance and cohesion. Many teams can overcome an initial challenge or two, but only resilient teams can sustain performance and morale over time.

Although authors agree on the positive role that team resilience can play in managing difficulties, this consensus does not extend to its conceptualisation. Some authors define team resilience as an emerging capacity or state that helps the team cope with difficulties. Others consider it a dynamic process of adaptation or a positive outcome following a problematic situation (Hartwig et al., 2020; Stoverink et al., 2020). Conservation of Resources theory (COR) emphasises the key role of resources in motivating human behaviour. Teams that can acquire, protect and grow their resources develop their ability to cope with difficulties (Hobfoll, 1989).

Agile project management is grounded in several practices and principles that promote, among other things, autonomy, self-organisation, and continuous learning (Malik et al., 2021). These practices can help teams develop resources to strengthen their resilience. Our study focuses on the agile organisational environment, a little-explored factor, as a means of improving a team's ability to cope with challenges. Our research question is therefore: What is the impact of the agile organisational environment on team resilience?

To answer our research question, we examined two types of effects. First, we analysed the direct impact of the agile organisational environment on team resilience. In addition, we examined the indirect effect mediated by mutual support and customer involvement. Our work is organised as follows: we begin by presenting the conceptual framework and hypotheses. Next, we develop the research methodology and the results obtained. Finally, we conclude with a discussion of the results and our conclusions.

Conceptual Framework and Hypotheses

Recent research has demonstrated that project management in agile mode promotes flexibility. It adds value for customers and simplifies project processes (Dong et al., 2024). However, implementing this management style can encounter obstacles. These obstacles arise from conflicts that can arise in business processes, as well as from the ambiguity and high uncertainty inherent in iterative approaches. Indeed, several characteristics of the agile approach, such as the nature of project teams or the lack of documentation, can encounter obstacles related to organisational procedures and policies (Boehm & Turner, 2005). To fully benefit from agile project management, an organisation must establish an environment that embraces and promotes agility.

In the existing literature, several authors, including Chow and Cao (2008), Altuwajri and Ferrario (2022), and Barros et al. (2024), have identified success factors in agile project frameworks. These factors are multidimensional and interdependent. Our study focuses on the agile organisational environment as a key factor that has been little studied and constitutes an essential lever for team resilience and, consequently, for project success. We operationally define the variable ‘agile organisational environment’ as the set of contextual and structural conditions established by the organisation to support agile project teams. These include an appropriate reward system aligned with agile values, facilities and physical settings adapted to agile ways of working, a cooperative organisational culture, an oral culture that values face-to-face communication, appropriate platform technologies and tools, and an organisation-wide acceptance of agile methodology. This definition is informed by Chow and Cao’s (2008) empirical work on the success factors of agile.

Drawing on COR theory (Hobfoll, 1989) as the primary theoretical framework, we propose that the agile organisational environment fosters project team resilience through three distinct pathways. The first pathway links the agile organisational environment directly to team resilience. The other two are indirect pathways mediated by mutual support and customer involvement. Two other theories have supported these indirect pathways. Firstly, Psychological Safety Theory was used to explain the role of mutual support in the link between the agile organisational environment and team resilience. Engagement Theory was used to explain the role of customer involvement in this relationship. The rest of the text details the three paths and the corresponding hypotheses.

Access to these resources is therefore an important factor in ensuring the success of project teams (Hamsal et al., 2022). These resources can be divided into different categories. Khasawneh and Dweiri (2024) examined technological resources. They found that inadequate infrastructure components (digital tools, readiness, IT environment) or those that do not support the team in their work hinder project success.

Regarding organisational infrastructure, Franco et al. (2024) emphasised that a flexible infrastructure enables the organisation to adapt more effectively, innovate, and remain competitive. For a project team, avoiding bureaucracy helps it to be more resilient (Varajao et al., 2021). Based on these arguments, we formulate the following hypothesis:

H1: An agile organisational environment has a positive impact on team resilience.

According to The Theory of Psychological Safety (Edmondson, 1999), when the organisational environment reduces interpersonal risks, team members feel reassured to speak up and support each other. An agile organisational environment encourages cooperation and face-to-face communication. We can therefore consider it an important lever for promoting mutual support among team members.

Hoegl and Gemuenden (2001) conceptualised mutual support as a set of characteristics within the team. This includes the degree of mutual respect among team members and the assistance each member provides to others when needed. It also includes developing other team members' ideas and contributions (Hoegl & Gemuenden, 2001, p. 438).

According to COR theory, mutual support can be considered a social resource that enhances team resilience. In the context of agile projects, Poth et al. (2024) show that mutual support contributes to improved teamwork quality. Furthermore, several studies have empirically demonstrated the importance of factors closely related to mutual support (e.g., collaboration and trust) in promoting team resilience (Hamsal et al., 2022; Varajao et al., 2021). This analysis leads us to consider mutual support as a mediating variable in the link between the agile organisational environment and team resilience. Thus, we propose the following hypotheses:

H2a: The agile organisational environment has a positive impact on mutual support.

H2b: Mutual support has a positive impact on team resilience.

H2c: Mutual support mediates the relationship between the agile organisational environment and team resilience.

The agile organisational environment can be considered as a lever for customer involvement in the light of Engagement Theory (Kahn, 1990). This approach defines engagement as a psychological state characterised by the cognitive, emotional, and behavioural activation of an individual in relation to a role or activity. In an agile framework, several mechanisms contribute to stimulate these dimensions: transparency in processes, continuous communication, and incremental delivery (cognitive involvement), the feeling of recognition and consideration (emotional involvement), as well as active participation in decisions (behavioural involvement).

If the direct evidence on the impact of the agile organisational environment on customer involvement remains limited, several empirical studies show that customer involvement has positive effects on project success (Chow & Cao, 2008; Altuwaijri & Ferrario, 2022; Barros et al., 2024). Beyond its direct effect on performance, customer involvement strengthens team resilience by providing timely feedback, which constitutes a valuable resource under COR theory (Hobfoll, 1989).

Based on these observations, we hypothesise that an agile organisational environment promotes customer involvement. This, in turn, improves the team's ability to cope with the challenges it faces. Customer involvement, therefore, plays a mediating role in this mechanism. We therefore propose the following hypotheses:

H3a: The agile organisational environment has a positive impact on customer involvement.

H3b: Customer involvement has a positive impact on team resilience.

H3c: Customer involvement mediates the relationship between the agile organisational environment and team resilience.

Method

Study Design

This study employs a quantitative methodology to analyse the relationship between an agile organisational environment and team resilience within an agile project team in the Moroccan IT sector. This research is based on a primary theory, the COR theory. Theories of engagement and psychological safety have since supplemented it. The conceptual framework highlights two types of effects. First, a direct effect linking our explanatory variable to the variable to be explained. Second, an indirect effect is introduced through two mediating variables: mutual support and customer involvement.

Population

This research targets professionals working on agile projects in Morocco's IT sector. The decision to target Moroccan project teams provides evidence of an emerging economy in which project activity is increasing. Furthermore, research on agile team dynamics and team resilience in this field remains limited.

Sample size and Sampling technique

The study adopts a non-probabilistic sampling method. The lack of a comprehensive database of agile project teams in Morocco explains this choice. The study initially employed purposive sampling to identify and target individuals with relevant agile experience and expertise. This was followed by snowball sampling to expand participation through professional networks and referrals from initial respondents.

A total of 153 questionnaires were distributed and collected, of which 142 were valid and retained for analysis. The achieved sample size was well within the recommended guidelines for robust structural equation modelling, given the number of indicators in the measurement model.

Instrument for Data Collection

The questionnaire is based on measurement tools from previous research. Five items measured an agile organisational environment, and Customer involvement was measured by three items, both adapted from Chow and Cao (2008). An agile organisational environment was labelled initially 'organisational environment'. Given the agile-specific nature of the items and the context of this study, we renamed the construct and adapted its items. The adaptations consisted of slight rewording and clarifications to improve the clarity of the terms, while preserving the content's validity. Mutual support was measured by seven items adapted from Hoegl and Gemuenden (2001). Team resilience was measured by six items adapted from Mallak et al. (1998). All items were rated on a 7-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (7). The questionnaire included demographic questions to contextualise the sample.

Method of Data Analysis

Data was analysed using PLS-SEM. This choice was supported by the model, which presents direct and indirect hypothetical relationships. The analysis was carried out in two stages. The first stage consisted of evaluating the validity and reliability of the measurement model. In this stage, internal consistency was evaluated using Cronbach's alpha and Composite Reliability (CR). Next, convergent validity was assessed using AVE, and discriminant validity was assessed using the Fornell–Larcker criterion. The second stage of this process involved

evaluating the structural model to examine the relationships among its variables. During this stage, we assessed the model's quality using the coefficient of determination (R^2). Multicollinearity was also assessed using the Variance Inflation Factor (VIF). Finally, the model's predictive power was assessed using Q^2 and PLS Predict.

Results

Demographic information's

The sample consists of 142 professionals actively involved in agile project teams in the Moroccan IT sector. The sample is approximately balanced by gender (51% male, 49% female). We observe diversification in the roles held within the team. However, there is a predominance of team development members (26% developers, 20% testers, 3% analysts/designers). 49% of our professionals have 1-3 years' experience within their respective teams. Regarding the agile methodology used, 54% of teams use Scrum, while 24% combine it with another methodology. Table 1 presents an overview of the sample's demographic characteristics.

Table 1. Demographic profile of the samples (n = 142).

No	Demographic Profile	N	(%)
1.	Gender		
	Male	72	51
	Female	70	49
2.	Role in the team		
	Tester/QA	28	20
	Scrum Master	20	14
	Product Owner	11	8
	Developer	37	26
	Project Manager	28	20
	Analyst/Designer	4	3
	Others	14	10
3.	Tenure in the current agile team		
	Less than 6 months	17	12,0
	6 months to 1 year	17	12,0
	1 to 3 years	69	48,6
	3 to 5 years	26	18,3
	More than 5 years	13	9,2
4.	Agile methodologies used		
	Scrum, SAFe	16	11
	Scrum, Kanban, SAFe	6	4
	Scrum, Kanban	13	9
	Scrum	77	54
	SAFe (Scaled Agile Framework)	23	16
	Kanban	3	2
Others	4	3	

Measurement Model Assessment

The results show that all indicators exceed the recommended thresholds. According to methodological recommendations, factor loadings must exceed 0.6 to indicate good reliability.

Our results indicate that all loadings are above the 0.60 threshold. This confirms that the items contribute strongly to their respective constructs.

Cronbach's alpha and CR exceed the recommended threshold of 0.70, indicating good reliability and construct validity. AVE values are higher than the recommended threshold of 0.50, indicating good convergent validity. Table 2 presents all of these results.

Table 2. Measurement model analysis result.

Variables	Code	Loading α	CR	AVE	
Organisational environment			0,864	0,902	0,650
	OE2	0,809			
	OE3	0,840			
	OE4	0,723			
	OE5	0,859			
	OE6	0,792			
Mutual support			0,946	0,956	0,758
	MS1	0,850			
	MS2	0,787			
	MS3	0,868			
	MS4	0,883			
	MS5	0,898			
	MS6	0,897			
	MS7	0,905			
Customer involvement			0,716	0,826	0,614
	CI1	0,725			
	CI2	0,781			
	CI3	0,841			
Team resilience			0,896	0,921	0,659
	TR1	0,776			
	TR2	0,850			
	TR3	0,769			
	TR4	0,809			
	TR5	0,866			
	TR7	0,798			

The next step consisted of discriminant analysis of the model. This was carried out according to the Fornell–Larcker criterion. The results confirm the discriminant validity of all variables, as the items are better aligned with their own constructs. With regard to VIF, the results show that all values are lower than 3. Thus, the model's explanatory variables exhibit no

multicollinearity. These results are particularly important in demonstrating that Mutual Support and Agile Organisational Environment, which are strongly related, remain empirically distinct. We thus confirm that they capture complementary but conceptually different dimensions. Table 3 presents the results of the discriminant analysis.

Table 3. Discriminant validity analysis results.

	CI	MS	OE	TR
Customer Involvement	0,784			
Mutual support	0,480	0,871		
Organisational environment	0,502	0,718	0,806	
Team resilience	0,557	0,773	0,770	0,812

Structural Model with SMART PLS

The structural model analysis includes variable testing, model quality analysis and predictive capacity. First, we tested the hypotheses using bootstrapping techniques. The model's quality was assessed using R². This indicator highlights the model's explanatory strength. Thus, a value of 0.67 is considered substantial, 0.33 moderate, and 0.19 weak. The model's predictive power was assessed using Q². Q² values of 0.02, 0.15, and 0.35 correspond to low, medium, and high predictive relevance, respectively. Figure 1 illustrates the structural model assessment and the findings from the hypothesis testing are shown in Table 4.

Figure. 1. Structural model assessment

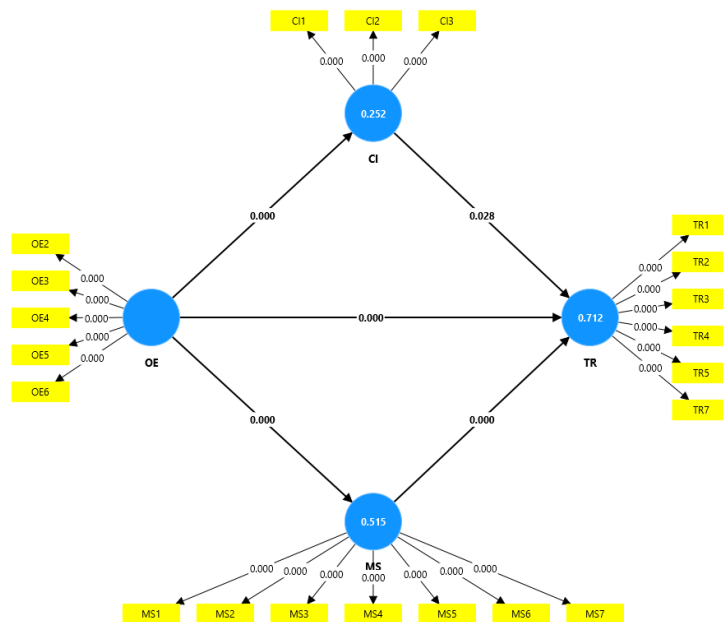


Table 4. depicts the results of the hypothesis analysis and the coefficients of determination.

Hypothesis	Structural Path	B	STDEV	T statistics	P values	Hypothesis Test Result
H1	OE -> TR	0,392	0,083	4,748	0,000	Supported
H2a	OE -> MS	0,718	0,077	9,338	0,000	Supported
H2b	MS -> TR	0,415	0,103	4,026	0,000	Supported
H2c	OE -> MS -> TR	0,298	0,079	3,772	0,000	Supported
H3a	OE -> CI	0,502	0,082	6,119	0,000	Supported
H3b	CI -> TR	0,161	0,073	2,200	0,028	Supported
H3c	OE -> CI -> TR	0,081	0,035	2,288	0,022	Supported
		R²	Q²			
	Customer Involvement	0,252	0,238			
	Mutual support	0,515	0,503			
	Team resilience	0,712	0,586			

The analysis of the first path shows that the agile organisational environment is positively and moderately related to team resilience ($\beta = 0.392$, $p = 0.000$; $t = 4.748$), thereby supporting hypothesis H1. In the second path, the agile organisational environment demonstrates a strong positive relationship with mutual support ($\beta = 0.718$, $p = 0.000$; $t = 9.338$), confirming hypothesis H2a. Furthermore, mutual support has a moderate positive effect on team resilience ($\beta = 0.415$, $p = 0.000$; $t = 4.026$), supporting hypothesis H2b. Mutual support significantly mediates the relationship between the agile organisational environment and team resilience, with a moderate indirect effect ($\beta = 0.298$, $p = 0.000$; $t = 3.772$). Thus, hypothesis H2c is confirmed. In the third path, the agile organisational environment has a substantial positive impact on customer involvement ($\beta = 0.502$, $p = 0.000$; $t = 6.119$), supporting hypothesis H3a. Customer involvement has a positive impact on team resilience, with a weak effect ($\beta = 0.161$, $p = 0.028$; $t = 2.200$), validating hypothesis H3b. The mediation effect of customer involvement on the relationship between the agile organisational environment and team resilience was confirmed by a positive, significant, weak effect ($\beta = 0.081$, $p = 0.022$; $t = 2.288$), supporting hypothesis H3c.

In terms of model quality, the model accounts for 25.2% of the variance in customer involvement and 51.5% of the variance in mutual support. These values indicate moderate explanatory strength. The model explains 71.2% of the variance in team resilience, which is substantial.

Regarding the model's predictive power. Customer involvement shows moderate predictive power with a Q^2 value of 0.238. Mutual support ($Q^2 = 0.503$) and team resilience ($Q^2 = 0.586$) demonstrate strong predictive power.

Discussion

Since the publication of the Agile Manifesto in 2001, agility has attracted interest among academics and practitioners. Previous research has focused on the key factors for agile success, particularly scope, quality, cost, and time. However, the uncertain environment in which projects evolve has led us to focus on resilience. The latter represents the ability of the team to

maintain its performance in the face of obstacles, thereby promoting the project's success even during difficult periods. Nowadays, project teams need to be agile and resilient. It is in such a context that we choose to focus on an agile factor, little explored but important, it is the agile organisational environment. Our study seeks to examine how the agile organisational environment influences team resilience, both directly and indirectly. Thus, we highlight three paths linking the agile organisational environment to team resilience.

Path 1: The agile organisational environment directly affects team resilience. More specifically, the high loadings of items related to technologies and tools adapted to agility, cooperative organisational culture, and work facilities adapted to agile practices suggest their importance in this model. These elements constitute essential organisational resources that enable teams to coordinate quickly, share information, and adapt to disruptions. These results align with Bowers et al. (2017). Indeed, although they did not explicitly address the impact of the agile organisational environment on team resilience, they introduced a model that highlights a set of organisational inputs and processes that promote team resilience.

Path 2: The agile organisational environment impacts team resilience through the mediating effect of mutual support, representing the strongest observed path in our model. Thus, an organisational culture promoting communication and cooperation directly encourages mutual support by reducing interpersonal barriers. From the perspective of psychological safety theory, such environments reduce interpersonal risks. This allows team members to feel comfortable sharing their ideas, asking for help, and even admitting their mistakes. As a result, trust and openness prevail within the team. While agile technologies and work facilities facilitate communication and interaction, it is primarily a cooperative cultural orientation that encourages supportive behaviour among team members. When team members provide one another with the necessary support, they are better able to maintain their performance in difficult situations. Although this path has not been tested before, our results support and complement previous studies that highlight that team resilience emerges from team interactions and that mutual support is central to agile project success (Hartwig et al., 2020; Poth et al., 2020).

Path 3: The agile organisational environment affects team resilience through the mediating effect of customer involvement. This path illustrates the interconnection between the company's internal and external factors. Thus, the organisational environment, an internal factor, directly affects customer involvement, an external factor. The latter, in turn, directly affects team resilience, a company-level internal factor. This conclusion supports the idea that team resilience results from both internal and external factors within the company. Although these results have not been tested before, they confirm previous findings highlighting the positive role of customer involvement in improving project outcomes (Altuwajri & Ferrario, 2022; Barros et al., 2024; Chow & Cao, 2008).

In addition to these results, our analysis demonstrates that the direct effect of the agile organisational environment on team resilience as well as the indirect effect mediated by mutual support have a moderate impact on team resilience. However, the indirect effect mediated by customer involvement is weak. This suggests that the customer involvement is an external factor that can be influenced by other extra-company factors, but should not be overlooked due to its significant impact on team resilience.

Based on COR theory, an agile organisational environment provides the team with resources that promote resilience. This is essential in an emerging economy with limited resources. Social resources translate into a cooperative organisational culture and mutual support within the team. Structural resources, such as agile tools and work facilities, facilitate coordination and flexibility. Customer involvement is a significant external resource that provides the team with necessary information promptly, thereby reducing resource loss. In addition, a good relationship with the customer provides an additional social resource that promotes trust and mutual understanding. The accumulation and interaction of these resources help teams to conserve resources that they can mobilise in the face of adversity.

This work makes several contributions at different levels. Theoretically, it addresses a gap in the literature by analysing the role of the agile organisational environment in team resilience, given that previous studies have focused more on other indicators of project success. This choice is relevant insofar as project teams operate in an uncertain environment in which resilience is essential to ensure performance. This research shows that an agile organisational environment has a positive impact on team resilience, which is a new perspective. The model incorporates three theories (COR, Psychological Safety, and Theory) that demonstrate how an agile organisational environment, social relationships among team members, and customer involvement in the project promote team resilience. The study identified one direct and two indirect mechanisms, which were tested empirically. These findings provide rare evidence from the Moroccan information technology sector, which is an emerging economy. In this context, teams often face greater uncertainty and resource constraints. Establishing an agile organisational environment and strong team dynamics is therefore crucial to maintaining resilience. This complements previous work, most of which has been carried out in more developed economies. In practice, the work provides operational recommendations for managers to strengthen their teams' resilience within an agile organisational environment. This also involves encouraging mutual support among team members while integrating the customer into the project as best as possible.

Conclusion

This study examines how an agile organisational environment influences team resilience in agile project contexts by analysing both its direct impact and its indirect effects through mutual support and customer involvement. The results show a significant direct effect of the agile organisational environment on team resilience, with mutual support acting as a moderate mediator and customer involvement exerting a weaker but significant indirect effect. These findings suggest that team resilience emerges from the interplay between structural flexibility, supportive team dynamics, and external collaboration. By shifting the focus from traditional project success metrics to the sustainability of team performance, this study positions resilience as a core organisational capability. It extends research on agile project management, particularly in an emerging-economy context.

From a managerial perspective, the results strongly encourage managers to prioritise fostering a positive team dynamic that promotes mutual support among team members. Managers are also encouraged to create an agile organisational environment by promoting a cooperative organisational culture and adopting agile work facilities and technological tools. Although the effect is small, maintaining a good relationship with the client and encouraging their presence and commitment to the project will promote the resilience of agile project teams. The

recommendations outlined above are highly applicable: the model explains a substantial portion of team resilience and demonstrates strong predictive relevance, enabling managers to anticipate future levels of team resilience.

This study has several limitations. Its cross-sectional design restricts causal inference, and the sample, while suitable for PLS-SEM, reflects a specific context, which may limit generalisability across industries and cultures. In addition, the dominance of certain agile methodologies may not fully capture the diversity of agile practices. Future research should adopt longitudinal and cross-context designs, examine additional mediators and moderators (e.g., leadership or team composition), and employ mixed-methods approaches to capture the dynamic development of team resilience better.

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