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Recommended Citation

Baumann, Annika; Krasnova, Hanna; Veltri, Natasha F.; and Ye, Yunsi, "Men, Women, Microblogging: Where Do We Stand?" (2015). *Wirtschaftsinformatik Proceedings 2015*. 58.
<http://aisel.aisnet.org/wi2015/58>

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Men, Women, Microblogging: Where Do We Stand?

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Abstract. With millions of users worldwide, microblogging has developed into a powerful tool for interaction and information dissemination. While both men and women readily use this technology, there are significant differences in how they embrace it. Understanding these differences is important to ensure gender parity, provide advertisers with actionable insights on the marketing potential of both groups, and to inform current theories on how microblogging affordances shape gender roles. So far, existing research has not provided a unified framework for such analysis, with gender insights scattered across multiple studies. To fill this gap, our study conducts a comprehensive meta-review of existing research. We find that current discourse offers a solid body of knowledge on gender differences in adoption, shared content, stylistic presentation, and a rather convoluted picture of female and male interaction. Together, our structured findings offer a deeper insight into the underlying dynamics of gender differences in microblogging.

Keywords: Microblogging, Twitter, Gender Differences, Meta-Review.

1 Introduction

Having imposed its famous “140-character limit” in 2006, Twitter has coined the term microblogging (MB). Since then it remains the most widely used MB platform with over 255 million monthly active accounts and is ranked as the fifth most popular social network in the world [83]. Spurred by its success, other MB platforms have mushroomed, including such popular ones as Tumblr and Sino Weibo in China.

Originally designed to broadcast and share information about user’s activities and opinions in an easy format [77], MB was quickly embraced by the global online community as a tool for fast dissemination of the most current information. Now companies, politicians and celebrities increasingly rely on MB to stay connected with their audiences and promote their views. However, as MB continues to evolve and become more powerful, a growing number of stakeholders question whether MB equitably benefits different population groups, including minorities, females, and users from remote geographic regions [e.g. [40], [57]]. Particularly, gender differences

have been discussed in the MB research for a number of social, theoretical and practical reasons. Specifically, from a social perspective, understanding the differences in male and female use of MB for information dissemination is essential to ensure gender parity and a globally equitable information society [72]. From a theoretical standpoint, past research has identified significant gender differences across a variety of IT contexts, suggesting that certain functional affordance may support, but also change traditional gender roles and behaviors [e.g. [74], [86]. Considering the popularity of MB, it is hence critical to understand the role that MB may play in these processes. Finally, understanding gender differences in MB is important for practical reasons: MB has a great potential to viral spreading, e.g., in form of candy or firestorms. Hence, understanding gender specific behavior - for example by identifying user groups that are more likely to reshare, or the presence of gender homophily in resharing – can be an important step in managing word-of-mouth in MB channels [65].

Reflecting importance of this topic for both theory and practice, many studies focus directly on gender differences in MB [e.g., [3], [25], or provide supplementary gender-related findings [e.g., [5], [7]. However, existing insights remain scattered, calling for a more systematic analysis. To fill this gap, this study conducts a comprehensive meta-review of existing research to provide a deeper insight into gender differences and similarities, and to give impetus to future research efforts in this area.

2 Theoretical Background

2.1 Microblogging

A specific set of core functional features is definitional for any MB platform: Participants can subscribe ("follow") each other via unidirectional relationships to get new status updates in the form of short messages ("tweets") from users they follow – their "followees". These messages can further be distributed in the network by reposting ("retweeting") them. Additionally, some MB platforms offer extended functionality to their users. For example, Sina Weibo allows for broader range of publishable media, additional settings for profiles, and a threaded comment system stimulating social interactions [64]. Furthermore, while Sina Weibo and Twitter still apply a "140-character" limit, Tumblr does not impose such limitation.

Attracted by the success of MB, research in this domain has been on the rise, with scholars initially focusing on the specifics of user behavior on these platforms. Examples include research on motivations to use MB [e.g. [42], privacy considerations [e.g. [75], continued use [42], [52] and approaches to user profiling e.g. [1], [2], [6]. As the use of MB matures, particular uses in specific contexts become apparent attracting further scholarly attention. Examples include the use of MB in politics [e.g. [13], [28] and in disaster management [e.g. [29], [36]. Recognizing an important role of gender discourse in the MB domain these studies often document gender differences as part of their supplementary findings [5], [7], [20] or even address gender differences as a key focus of their studies e.g. [3], [25], [53]. Nonetheless, these gender-related insights remain disorganized, impeding research progress in this area.

2.2 Gender Differences in Offline and Technology Settings

The evolutionary psychology explains gender differences by human ancestral past which over the time fostered women to be more compassionate and men more competitive [84]. As a result, women are better prepared for family-life routines and men have better skills to advance in their careers. The developmental social psychology offers a complementary view and asserts that gender differences develop in response to societal role expectations [68]. From the early age boys are encouraged to be independent, competitive and assertive, while girls are expected to be modest, social and nurturing [76]. Consequently, men learn to define themselves in terms of their separatedness from others, drawing their self-esteem from the level of their autonomy [67]. Women, in contrast, have a more pronounced tendency to define themselves in terms of their connectedness to others. They focus on relationships, cooperation; seek closeness and emotional support [67]. These particularities naturally impact the way men and women use and benefit from information systems. When it comes to technology adoption existing research finds men to be rather driven by their attitudes towards a new application, while women are influenced by opinions of others and relational uses of IT [86]. In the online context, men are shown to spend more time researching on the Web, as they strive to inform themselves or solve certain tasks [69]. Women, in contrast, use the email more [76]. Observing these differences it is natural to expect that the varied innate characteristics and social roles are also likely to translate into distinct gender patterns when it comes to MB.

3 Methodology

We followed recommendations of [87] and [81] for our meta-review. Initially, we performed a keyword search in various databases (ScienceDirect, EBSCOhost, Wiley Online Library, ACM Digital Library, IEEE Xplore Digital Library, Taylor & Francis Online, JSTOR, Google Scholar) considering only English language sources. Combinations of the following keywords were applied: {microblogs, microblogging, Twitter, Weibo} and {gender differences, gender, female, male, woman, women, man, men, girl, boy}. Only studies related to Twitter and Sina Weibo (later referred to as “Weibo”) were considered, since these are the most popular MB services using a 140-character limit. We did not limit the search by the year of publication. Articles identified as potentially relevant were scanned using the in-text search for relevant markers (e.g. “female”, “male”). We mainly concentrated on academic work that explicitly addressed specific differences between men and women with regard MB, whereas articles that dealt with only female (or male) perspective were excluded from our research. The second step involved a backward and forward search.

The final sample included 60 studies published between 2009 and 2014. Of those, 48 focused on Twitter, eleven on Weibo and one on both. 45% of articles appeared in journals, and 48% in conferences. 16 articles specifically focused on gender aspects. Most often real data extracted from microblogs was used (66.7%) and then content analyzed. Next, all articles were reviewed and relevant findings were extracted and organized into smaller chunks of information – *insights*. In total 205 insights were

identified. Two authors have independently reviewed the resultant material to identify a set of leading themes which were then compared and discussed. This approach allowed us to uncover five dominant themes (Table 1). Finally, each insight was assigned to a specific theme by two coders. Inter-coder reliability measured by Cohen’s kappa reached 0.808, providing evidence of a high level of agreement [79]. The final decision on the assignment of items to themes was reached by consensus.

Table 1. Themes in Gender-Relevant Discourse on Microblogging

<i>Theme</i>	<i>Theme Description: Gender differences in:</i>	<i>Share</i>
Adoption	...the use of MB and posting frequency.	16.67%
Content	...the choice of the microblog topic and specific content.	16.67%
Audience	...the interaction of users and their perceptions of it.	25.00%
Motivation	...motivational patterns of microbloggers.	4.90%
Presentation	...the writing style, layout, sentiment and word choice.	36.76%

4 Results: Gender Differences in Microblogging

4.1 Gender Differences in the Adoption of Microblogs

Men appear to have used Twitter for longer, suggesting more men among early adopters [30]. Currently an overrepresentation of females is reported by web analytics platforms [e.g. [61]. This result is also reflected in research (see Table 2): Far more studies report that females are more likely to use MB and to post there [e.g. [8]. Moreover, females are also slightly more likely to be addicted to Twitter [7], and plan to continue using it [42], [52]. Together, these insights suggest that females readily embrace MB functionality as a means to maintain contact, share and discuss [77].

Table 2. Gender differences in adoption of microblogging

	<i>Females are more likely to:</i>	<i>Males are more likely to:</i>
Usage	— use MB [8], [15], [18], [22], [23], [31], [48], [53], [60] ¹	— use MB [5], [19], [37]
Frequency	— <i>managers/politicians are equally likely to use MB</i> [50], [54] — post on MB [6], [24], [28], [46], [60] — <i>no difference in frequency of posting</i> [23], [43]	— post on MB [5], [19], [30]
Specifics of Use	— be active: midnight and midday [24] — be addicted to MB [7] — visit MB platforms more often [42] — <i>no difference in number of time spent on MB</i> [42] — <i>no differences in MB access modes</i> [12]	— be active: morning, evening and weekend [24]
Use in Time	— continue using MB [42], [52]	— have used MB longer [30]

¹ Citations selected in italics across tables refer to Sina Weibo, otherwise Twitter.

Nonetheless, in the case of special interest groups such as political candidates and managers, studies find no gender differences in the likelihood to adopt MB [50], [54], suggesting that both groups rely on Twitter for broadcasting their information and opinions in these contexts.

4.2 Gender Differences in the Content of Microblogs

In their offline communication women are known to be more supportive and social [67]; exhibit empathy [66]; concentrate on home and family [71], and subjective aspects [62]. In contrast, men have more pressure to establish their social standing, e.g. by communicating symbols of their success [69]. As a result, male communication offline is less conducive to emotional support, with men rather exchanging facts, information and quantitative evidence [85].

Table 3. Gender differences in the content of microblogging

	<i>Females more likely to share about:</i>	<i>Males more likely to share about:</i>
General Communication	– politics (protest) [48]	– politics [9], [10], [27]
	– personal content [30], [33], [53]	– serious and social topics [33]
	– significant others and partners [25]	– environmental news and issues [9]
	– housework and food [27]	– hot social events [20], [33]
	– job [30]	– electronics [27]
	– Grey's Anatomy, Revolverheld [9]	– sports [30]
	– menstruation [47]	– work [27]
	– “me now” messages [39]	– achievements and abilities [28]
	– references to gender [6]	– sobriety checkpoints [45]
	– provide more external links [30]	– sales promotions [33]
	– seek help [28]	– named entities (Apple's, NBA) [4]
		– <i>both journalist groups cover such topics as politics and government; technology and science economy and business; entertainment and celebrities; social welfare; express major opinions and disseminate information</i> [30]
	– <i>both mention significant other</i> [27]	
	– <i>help-seeking for men almost as common</i> [33]	
Disaster	– concern over magnitude [29], [36]	– reference news [36]
	– dread / risk aversion [29]	– reference politics [36]
	– concern of own health [29]	– jokes [36]
	– <i>no difference for likelihood to express concern for loss of material assets, concerns regarding health, or simple ambiguous fear</i> [29]	
Climate Change	– convinced users [26]	– users with skeptical stance [26]
	– specific hashtags [26]	– general hashtags [26]
	– private persons [26]	– climate scientists [26]
	– campaigns, movements [26]	
	– <i>news on climate change shared by both</i> [26]	

Evidence collected in the MB context is generally in line with these gender expectations (Table 3). We observe that personal content, lifecasting and concerns are common topics for female MB users [e.g. [30], [33]]. This is true even in professional

settings, with female journalists providing significantly more information on their day-to-day activities in their postings [30]. Furthermore, even though both groups tweet about their partners [27], there is evidence that females do it more often [25]. Moreover, women also engage more with such traditionally “female” topics as housework and food [27] whereas men rather emphasize a more general coverage [26], including such topics as politics [9], serious and social topics [33], environmental news [9], and events [20]. Politics is particularly popular, providing evidence that male microbloggers strive to have an impact beyond their local social networks and a family unit [9], [10]. Nonetheless, political engagement of women is also visible: Analysis of tweets related to London riots found that even though more men (112,052) contributed to the discussion on Twitter, 80,417 women did so as well [10]. Moreover, research on Egyptian protesters reported that women were more likely to use Twitter for communicating about protests than males [48]. Nonetheless, just as it is the case of traditional blogging, female “*social power is significantly weaker than [that of] men*” [88, p. 550]. Possible reasons include women’s lack of interest in politics, and unwillingness of top microbloggers to re-share female posts [73].

Expected gender differences in reaction to disasters can be also observed on Twitter. Specifically, analysis of tweets relating to the Hurricane Irene revealed that the words “safe” and “praying” were among the top terms for women [36], signaling their emotional needs in such situations. In contrast, men were more likely to mention “media”, “breaking”, “Obama” (hence reporting news and politics) and discuss practical issues such as “roofproofing” [36], which is in line with their tendency to report and respond to calls for specific actions [29].

All in all, it is noteworthy that even though MB offers users significant capabilities to compensate for the gender constraints they may experience offline (e.g. by enabling more help-seeking for men, or more political and social broadcasting for women), much of this potential still remains to be utilized.

4.3 Gender Differences in the Audience in Microblogging

Summarized in Table 4, scientific evidence on user interaction in MB suggests a complex and a somewhat convoluted picture. We observe that female sociability and concentration on close social networks gets reflected in their *reposting* behavior [67], with female Weibo users being more likely to repost messages [19], especially when in a two-way relationship, or when a message originates from friends [35]. In contrast, male users are more likely to create original posts (e.g., related to hot social events) than repost information [20]. When doing so, however, men rather repost novel information, and posts coming from non-friends [35]. This signals their broader orientation and lesser focus on their own social network. A somewhat different picture can be observed in terms of the *following* activity. While a study on Weibo finds that men have larger networks of followees [60], four studies report no difference in the size of male and female networks on Twitter [5], [23], [30], [50]. This is a noteworthy indicator for female audiences, suggesting that women are ready to embrace larger social networks (at least on Twitter) – an important affordance of MB.

We also observe complex dynamics in the attention paid to male and female users in terms of *following* them as opposed to *resharing* / *commenting* their posts. On the one hand, female politicians get more reshares on Twitter, as one study suggests [13]. Female Weibo users also are less likely to have a zero count of reshares and comments on their posts [19], and their posts get diffused quicker [34]. At the same time, men are shown to get more comments on both platforms [19], [56]. Moreover, four studies show that male users have more followers on both Twitter [23] and Weibo [55], [58], [60], with both men and women more likely to follow other men [23].

Table 4. Gender differences in interaction behavior and audience perceptions in MB

	<i>Females more likely to:</i>	<i>Males more likely to:</i>
Re-posting	<ul style="list-style-type: none"> – repost [19] – repost friends, superstars [35] – repost in 2-way relationship [35] 	<ul style="list-style-type: none"> – repost novel information [35] – repost non-friends [35] – repost in 1-way relationship [35]
Following	<ul style="list-style-type: none"> – no differences in retweeting frequency [43] – men have more followings [60] – men have more reciprocated relationships [23] – men have a larger sum of followers + followees [55] – no gender difference in the number of followees [5], [23], [30], [50] – no difference in follower-followee ratio [43] 	
Being reposted commented	<ul style="list-style-type: none"> – get more reshares [13] – have a non-zero count of reposts and comments [19] – get a higher response rate [59] – have posts diffused quicker [34] 	<ul style="list-style-type: none"> – get more comments [19], [56]
Being followed	<ul style="list-style-type: none"> – gender has no significant effect on reposting likelihood [20] – men have more followers [23], [55], [58], [60] – men and women more likely to follow another man. [23] – no gender difference in the number of followers [5], [30], [43], [50] 	
Credibility and Influence	<ul style="list-style-type: none"> – 70% of the amount of public event influence is contributed by males [32] – men perceived as providing better content and be more authoritative [40] – male tweets perceived as more credible (esp. for politics) [57] – men nearly twice more influential than female users [60] – two thirds of the hot Weibos are created by male users [33] – no differences for behaviors of initiating / attracting communication [49] 	
Homophily	<ul style="list-style-type: none"> – present: reposting [33]; interaction [49]; commenting [56]; following [23]; tie formation (for mediators) [16] – absent: response to information seeking [59] 	

While this evidence is questioned by studies that show no gender difference in the number of followers [5], [30], [43], [50], there is solid support for men enjoying greater credibility and influence on Twitter [57] and Weibo [60], especially in a political context [57]. Several reasons may underlie this: First, unattractive topic choice, with women more likely to post about personal affairs [30], [33], may dictate the

narrow impact of female postings. Second, existing misbalance in perceptions can be attributed to the early advantage men hold [70]: Historically occupying stronger positions in society men may find it easier to establish themselves as authoritative. These forces may intervene with the perceptions and behavior of users. All in all, however, the overall picture of user interaction with regard to gender remains visibly complex and more research is needed to gain a full understanding of this phenomenon.

4.4 Gender Differences in the Motivation to Use Microblogging

When it comes to motivation to use MB two different reasons are prevalent in literature: sharing subjective information about the self and distributing objective information [42]. Along these main motives are other reasons such as the interaction with others to seek help, give advice and discuss [77]. Further, some MB users are motivated by possibilities of professional development [42], self-expression [42], entertainment and leisure [42], [78], emotional aspects [89], [90], status enhancement [89], and educational purposes [52]. Motives to follow a particular user have also been discussed [11]. Nonetheless, only few findings shed light on the moderating role of gender – an unexpected conclusion. One study suggests that gender differences in the motivation may also depend on cultural aspects [42]. Specifically, there were no gender differences in motives to use MB in the US sample, yet in the Ukrainian sample men were more likely to support their professional development via MB whereas women were more likely to use MB for entertainment, as a diary function and for expressing emotions [42]. Other studies suggest that females are more likely to ask for help [28] and appreciate MB as a learning environment [52]. However, research remains limited, calling for more studies in this domain.

4.5 Gender Differences in the Presentation in Microblogging

Women and men express themselves in different ways offline: The verbal language used by females is perceived to be more pleasant, polite and personal [71], [82] whereas men express themselves in a more direct and factual fashion [71], [85]. In the nonverbal domain eye contact is perceived as a friendly attitude for women but may be seen as an attempt to dominate for men [80]. This hints that nonverbal communication is more important for and to women and that they are likely to be more conscious in this regard [63], [80]. Several of these particularities can be also observed in the context of MB (Table 5). Female users are more expressive in their communication and are more likely to use exclamations and question marks [e.g. 3], repetitions of characters in their preferred assessment and negation terms [e.g., 3], [4], and emoticons [e.g. 3], [4]. Female users also have a more personal writing style, which is reflected in their increased use of (personal) pronouns [e.g., 3], [4], whereas men rather prefer demonstrative pronouns [46]. Further, female messages are more polite and friendly as they are more likely to express a positive sentiment [53] and concern overall [29], [36].

Table 5. Gender differences in the presentation style and layout in microblogging

	<i>Females are more likely to use:</i>	<i>Males are more likely to use:</i>
Abbreviations	<ul style="list-style-type: none"> – abbreviations [3], [4] – OMG and LOL [3], [4], [43]; haha [6] 	<ul style="list-style-type: none"> – LMFAO [43]
	– <i>no difference in use of abbreviations</i> [46]	
Character Change	<ul style="list-style-type: none"> – repetitions of alphabetical characters [3], [4], [38], [43] 	<ul style="list-style-type: none"> – alphabetical character re-placements and deletions [38]
Hashtags	<ul style="list-style-type: none"> – declarative [14] and specific [26] hashtags 	<ul style="list-style-type: none"> – more hashtags [14] – imperative [14], descriptive [26] hashtags
Layout	<ul style="list-style-type: none"> – own layout designs [2], [17] – magenta [17], pink, yellow, green, red, light blue [1] – high brightness colors [17] 	<ul style="list-style-type: none"> – pre-defined designs [1], [2] – (dark) blue [1], [17], black, brown, orange, gray [1] – low brightness colors [17]
Linguistics	<ul style="list-style-type: none"> – (personal) pronouns [3], [4], [44], [46] – <i>equal use of third person pronouns</i> [46] – <i>no differences in use of articles, determiners, prepositions</i> [3], [4] 	<ul style="list-style-type: none"> – demonstrative pronouns [46]
Punctuation	<ul style="list-style-type: none"> – exclamation and question marks [3], [4], [43] 	
Emoticons	<ul style="list-style-type: none"> – emoticons [3], [4], [6], [43], [51] – :, <3 [43] / :D, ;) [3], [4] 	<ul style="list-style-type: none"> – :D, ;) [43] / :-o, :-& [51]
Special Words	<ul style="list-style-type: none"> – assessment: okay, yes[ssss] [3], [4] – negation (cannot, nooo[o]) [3], [4] – non-dictionary words [3], [4] – hesitation / backchannel sounds, e.g. ugh, grr, ah, hm [3], [4], [43] 	<ul style="list-style-type: none"> – assessment (yessir, yea[h]) [3], [4], [43] – negation (nah, nobody, ain't) [3], [4] – dictionary terms [3], [4] – named entities e.g. NBA [3], [4]
	– <i>men and women used nearly the same top ten words</i> [44]	
Sentiment	<ul style="list-style-type: none"> – positive valence [53] – risk aversion [29] – concern [29], [36] – <i>no differences in expressing anger</i> [29] – <i>no difference in tone of comments</i> [13] 	
Swearing	<ul style="list-style-type: none"> – alphabetical character change in case of swear words [46] 	<ul style="list-style-type: none"> – swear words [3], [4] in a homogenous writing style [46]
	– <i>men and women use almost the same swear words</i> [46]	
Tweet Style	<ul style="list-style-type: none"> – ellipses [3], [4], [43] – gender-marked language [41] 	<ul style="list-style-type: none"> – more full hyperlinks [6]

When it comes to nonverbal communication women are more likely to choose their own layout design [2], [17] preferring more bright and “female” colors [1], [17], whereas males do not put much effort into their layout design [1], [2] and prefer dark and typically “male” colors [1], [17]. Overall, both men and women behave in stereotypical ways in MB in terms of their presentation style.

5 Concluding Remarks, Limitations and Future Research

Our literature review has identified gender differences and similarities in several aspects of MB, which are both consistent and divergent from the traditional view on gender offline [e.g., 67], [85]. While male microbloggers were the earliest adopters [30], females outnumber them by now [61]. Overrepresentation of female users, their desire to post more [6] and to continue using the site [42] signals that MB both taps into their relational orientation as well as opens them new venues to reach beyond their traditional boundaries, e.g., we find that women increasingly blog in typically “male” contexts (e.g. London Riots [10] or Egyptian protests [48]). Nevertheless, men continue to dominate political MB-sphere. Since equal gender participation in social and political life is important for equitable and fair society, encouraging female participation in this area appears to be a critical conclusion of our research.

Based on our findings, both male and female users emerge as important population groups for marketers, yet in different ways. Since females are more likely to reshare content in their personal circles [35], they are in a strong position to create word-of-mouth through their networks, which is of interest to marketers who strive to capitalize on the “Twitter effect” [65]. At the same time, male opinions are perceived as more credible [40], [57], suggesting that male endorsements are likely to have a more pronounced influence on the audience.

Our study is prone to several limitations. Due to strict space restrictions only two platforms - Twitter and Weibo – were in the focus of our attention. Yet, insights from other platforms, such as Tumblr and Yammer, may enrich the body of knowledge presented above. Further, there are some cultural and functional differences between Twitter and Weibo: For example, it is possible to express much more in 140 characters in Chinese than in English, complicating objective comparisons. Furthermore, identifying the gender of users on MB platforms might be rather challenging. Several studies use name lists to assign a gender to provided user names. This method might be prone to errors and states therefore a limitation. Finally next to the demographic dimension gender, a further analysis including the age of MB users was not part of our study. Therefore the segmentation into age groups will be part of further research. Since Twitter has a more Western and Weibo a more Eastern background, cultural differences should to be taken into account. Indeed, cultural aspects may influence the way users interact with MB platforms, calling for more studies in this area.

Since identifying areas of future research is among the main tasks of a sound meta review [81], [87] our analysis reveals a solid body of knowledge on gender differences in the areas of MB adoption, shared content, and stylistic presentation. At the same time, a rather convoluted picture of female and male interaction patterns is un-

covered (“audience” category) – an important area for future investigation, especially in the context of Twitter. Moreover, we observe little or no findings on two topics of critical interest for MB providers and scholars – gender differences in motivational patterns and privacy behavior of MB users. Together, these under-researched domains offer exciting opportunities for future scholarly endeavors.

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