



# **Who Sells Knowledge Online?**

## **Understanding Online Identities of Knowledge Influencers on Pay-for-knowledge Platforms**

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# INTRODUCTION

## Background



Source: <https://www.sixthtone.com/news/1001161/why-money-cant-buy-you-knowledge-%E2%80%94-except-in-china>

# Motivation

## Online influencers (网红 Wanghong)

- ❖ Can attract others and shape their attitudes and behavioral intentions (Bakshy et al., 2011; Lin et al., 2018)

## Knowledge influencers in this research

- ❖ Special type of online influencers that can create and share knowledge-intensive content
- ❖ Having drawn numerous users as such content can benefit the users (Fang, 2017)

## Pay-for-knowledge platforms

- ❖ Developing functions enabling knowledge influencers to monetize the content (Kuang et al., 2019)
- ❖ Examples: Zhihu, Weibo Q&A, Fenda, Ximalaya FM, etc. (e.g., Jan et al., 2018; Yang & Ye, 2019)

- Bakshy, E., Hofman, J. M., Mason, W. A., & Watts, D. J. (2011). Everyone's an influencer: Quantifying influence on twitter. In *Proceedings of 4th ACM International Conference on Web Search and Data Mining* (pp. 65-74).
- Fang, J. (2017). *Payment: The Emergence of Internet-enabled Knowledge Economy* (in Chinese). Beijing, China: China Machine Press.
- Lin, S., Kim, H., Tan, F. T. C., & Leong, C. (2018). Navigating value co-creation in entertainment: A netnography study on the Wanghong ecosystem. In *Proceedings of 22nd Pacific Asia Conference on Information Systems* (PACIS 2018, Yokohama, Japan): Article 234. Retrieved from <https://aisel.aisnet.org/pacis2018/234/>
- Jan, S. T., Wang, C., Zhang, Q., & Wang, G. (2018). Analyzing payment-driven targeted Q&A systems. *ACM Transactions on Social Computing*, 1(3), 12. doi:10.1145/3281449
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- Yang, X., & Ye, H. J. (2019). Commercialized content on social media platforms: Exploring the drivers of the viewership of paid Q&A. In *Proceedings of the 52nd Hawaii International Conference on System Sciences* (HICISS 2019, Hawaii, USA) (pp. 2709– pp. 2718). Retrieved from <http://hdl.handle.net/10125/59708>

# Problem Statement

## Limited understanding of their online identities

- ❖ Their online identities may inform consumers' purchasing decision-making
  - Informed by the signaling theory (e.g., Walther, 2011; Yang & Ye, 2019)
- ❖ Yet, the literature has not covered this emerging group of online influencers

## Attributes of the knowledge contributed by them unexplored

- ❖ Can also work as signals to inform consumers' purchasing decision-making (Wang et al., 2018)
- ❖ Yet, we do not know whether the knowledge attributes differ among knowledge influencers

## Two research questions (RQs)

- **RQ1:** *What are the online identities of knowledge influencers presented on pay-for-knowledge platforms?*
- **RQ2:** *Are there variations in knowledge attributes across knowledge influencers with different identities?*

- Walther, J. B. (2011). Theories of computer-mediated communication and interpersonal relations. *The Handbook of Interpersonal Communication*, 4, 443-479.
- Wang, J., Li, G., & Hui, K. L. (2018). *Do monetary incentives create a spillover effect on free knowledge contribution? Evidence from a natural experiment* (working paper). Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3212596](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3212596)
- Yang, X., & Ye, H. J. (2019). Commercialized content on social media platforms: Exploring the drivers of the viewership of paid Q&A. In *Proceedings of the 52nd Hawaii International Conference on System Sciences* (HICISS 2019, Hawaii, USA) (pp. 2709– pp. 2718). Retrieved from <http://hdl.handle.net/10125/59708>

# 2

## **THEORETICAL FRAMEWORKS**

# Framework for Identifying Online Identities

## Two dimensions differentiating online users' identities

- ❖ The degree of self-disclosure (Jensen Schau & Gilly, 2003)
- ❖ The desire to be identified by others (Kim, Chan, & Kankanhalli, 2012)

|                                                  | Degree of self-disclosure<br>(High) | Degree of self-disclosure<br>(Low) |
|--------------------------------------------------|-------------------------------------|------------------------------------|
| Desire to be identified by<br>others<br>(Strong) | <b>Category 1</b>                   | <b>Category 2</b>                  |
| Desire to be identified by<br>others<br>(Weak)   | <b>Category 3</b>                   | <b>Category 4</b>                  |

- Jensen Schau, H., & Gilly, M. C. (2003). We are what we post? Self-presentation in personal web space. *Journal of Consumer Research*, 30(3), 385-404.
- Kim, H. W., Chan, H. C., & Kankanhalli, A. (2012). What motivates people to purchase digital items on virtual community websites? The desire for online self-presentation. *Information Systems Research*, 23(4), 1232-1245.

# Framework for Investigating Knowledge Attributes

Exploring the variations of the knowledge attributes among them

- ❖ The heterogeneity of knowledge contributors may lead to the attributes varying (e.g., Phang et al., 2009)

The attributes of the knowledge in the form of online content (e.g., Lou et al., 2013; Pee & Chua, 2016; Wang et al., 2018)

- ❖ Knowledge quantity
- ❖ Knowledge quality
- ❖ Knowledge diversity

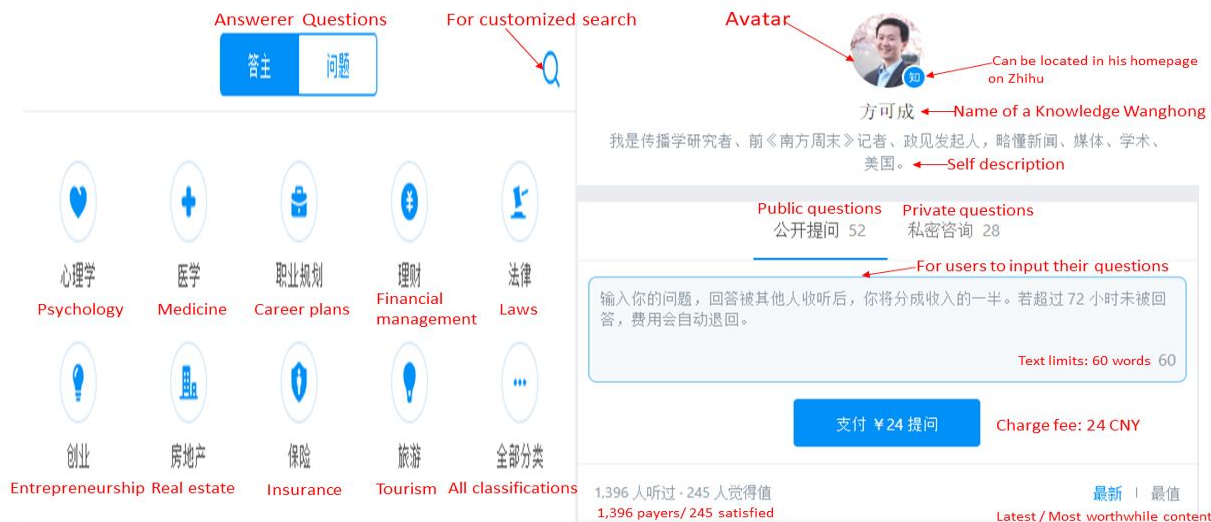
- Lou, J., Fang, Y., Lim, K. H., & Peng, J. Z. (2013). Contributing high quantity and quality knowledge to online Q & A communities. *Journal of the American Society for Information Science and Technology*, 64(2), 356-371.
- Pee, L. G., & Chua, A. Y. (2016). Duration, frequency, and diversity of knowledge contribution: Differential effects of job characteristics. *Information & Management*, 53(4), 435-446.
- Phang, C. W., Kankanhalli, A., & Sabherwal, R. (2009). Usability and sociability in online communities: A comparative study of knowledge seeking and contribution. *Journal of the Association of Information Systems*, 10(10), 721-747.
- Wang, J., Li, G., & Hui, K. L. (2018). *Do monetary incentives create a spillover effect on free knowledge contribution? Evidence from a natural experiment* (working paper). Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3212596](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3212596)

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## METHODS

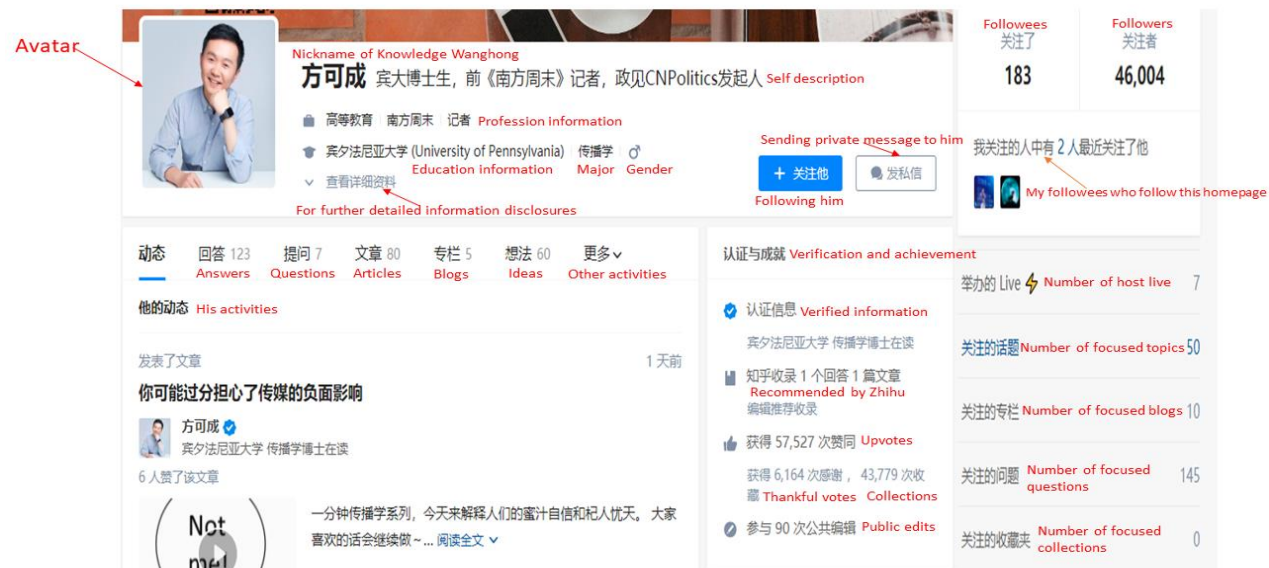
## Source

- ❖ Zhihu assists in the identification of knowledge influencers through a recommendation mechanism ([www.zhihu.com/zhi](http://www.zhihu.com/zhi))
- ❖ Two aspects for further data collection
  - ❑ Online self-presentation
  - ❑ Knowledge contribution



## Collection

- ❖ n=2618 (knowledge influencers)
- ❖ Metadata and textual content
  - ❑ Items regarding self-disclosure and being identified by others (metadata)
  - ❑ Records regarding knowledge contribution (metadata)



# Operationalization

## Five variables

- ❖ The degree of self-disclosure
- ❖ The desired to be identified by others
- ❖ Knowledge quantity
- ❖ Knowledge quality
- ❖ Knowledge diversity

## Textual content of self-presentation

- ❖ Self-description
- ❖ Expertise introduction

| Variable                              | Operational definition                                                                                                                                                                                  | Measures                                                                                             | Supporting literature                                                                                |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| The degree of self-disclosure         | The total number of presented items of self-disclosure on Zhihu                                                                                                                                         | Gender                                                                                               | Jin et al. 2015;<br>Lou et al. 2013;<br>Pee and Chua 2016;<br>Zhao et al. 2018;<br>Wang et al. 2018; |
|                                       |                                                                                                                                                                                                         | Place of residence                                                                                   |                                                                                                      |
|                                       |                                                                                                                                                                                                         | Contact information                                                                                  |                                                                                                      |
|                                       |                                                                                                                                                                                                         | Affiliation                                                                                          |                                                                                                      |
|                                       |                                                                                                                                                                                                         | Professional experience                                                                              |                                                                                                      |
|                                       |                                                                                                                                                                                                         | Educational experience                                                                               |                                                                                                      |
| The desire to be identified by others | The total number of identifications they presented on Zhihu                                                                                                                                             | Verification from the platform operator<br>Verification from the platform users                      |                                                                                                      |
| Knowledge quantity                    | The sum of the volumes of articles and questions for users' payment on Zhihu                                                                                                                            | The volume of articles for donation                                                                  |                                                                                                      |
|                                       |                                                                                                                                                                                                         | The volume of questions for purchasing                                                               |                                                                                                      |
| Knowledge quality                     | The sum of the log average number of users who donated to the knowledge influencers and the ratio number of satisfied users who paid the knowledge influencers for accessing the content they generated | Log average number of readers who donated to the articles written by the knowledge influencers       |                                                                                                      |
|                                       |                                                                                                                                                                                                         | Ratio number of satisfied consumers who paid for the questions answered by the knowledge influencers |                                                                                                      |
| Knowledge diversity                   | The number of topics covered both in the articles written by knowledge influencers and questions answered by knowledge influencers                                                                      | The number of topics across the articles and questions                                               |                                                                                                      |

- Jin, J., Li, Y., Zhong, X., & Zhai, L. (2015). Why users contribute knowledge to online communities: An empirical study of an online social Q&A community. *Information & Management*, 52(7), 840-849.
- Lou, J., Fang, Y., Lim, K. H., & Peng, J. Z. (2013). Contributing high quantity and quality knowledge to online Q&A communities. *Journal of the American Society for Information Science and Technology*, 64(2), 356-371.
- Pee, L. G., & Chua, A. Y. (2016). Duration, frequency, and diversity of knowledge contribution: Differential effects of job characteristics. *Information & Management*, 53(4), 435-446.
- Wang, J., Li, G., & Hui, K. L. (2018). *Do monetary incentives create a spillover effect on free knowledge contribution? Evidence from a natural experiment* (working paper). Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3212596](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3212596)
- Zhao, Y., Zhao, Y., Yuan, X., & Zhou, R. (2018). How knowledge contributor characteristics and reputation affect user payment decision in paid Q&A? An empirical analysis from the perspective of trust theory. *Electronic Commerce Research and Applications*, 31, 1-11.

# 1. Cluster Analysis

To classify the sample of knowledge influencers (n=2618) based on the *mean-value* cluster analysis (Guo et al., 2017)

- ❖ The degree of self-disclosure
- ❖ The desire to be identified by others

This will lead to a classification with **four** categories

- ❖ Category 1
  - ❑ High degree of self-disclosure; Strong desire to be identified by others
- ❖ Category 2
  - ❑ High degree of self-disclosure; Weak desire to be identified by others
- ❖ Category 3
  - ❑ Low degree of self-disclosure; Strong desire to be identified by others
- ❖ Category 4
  - ❑ Low degree of self-disclosure; Weak desire to be identified by others

- Guo, S., Guo, X., Fang, Y., & Vogel, D. (2017). How doctors gain social and economic returns in online health-care communities: a professional capital perspective. *Journal of Management Information Systems*, 34(2), 487-519.

## 2. LDA Topic Modeling

Each category will be labelled as a unique identity

- ❖ Using LDA topic modeling (Blei et al., 2003)
- ❖ Corpus for the LDA topic modeling by combining
  - Textual content of self-description
  - Textual content of expertise introduction

**Four** categories of knowledge influencers= **Four** corpora for the analysis

- Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent dirichlet allocation (LDA). *Journal of Machine Learning Research*, 3, 993-1022.

### 3. One-way ANOVA

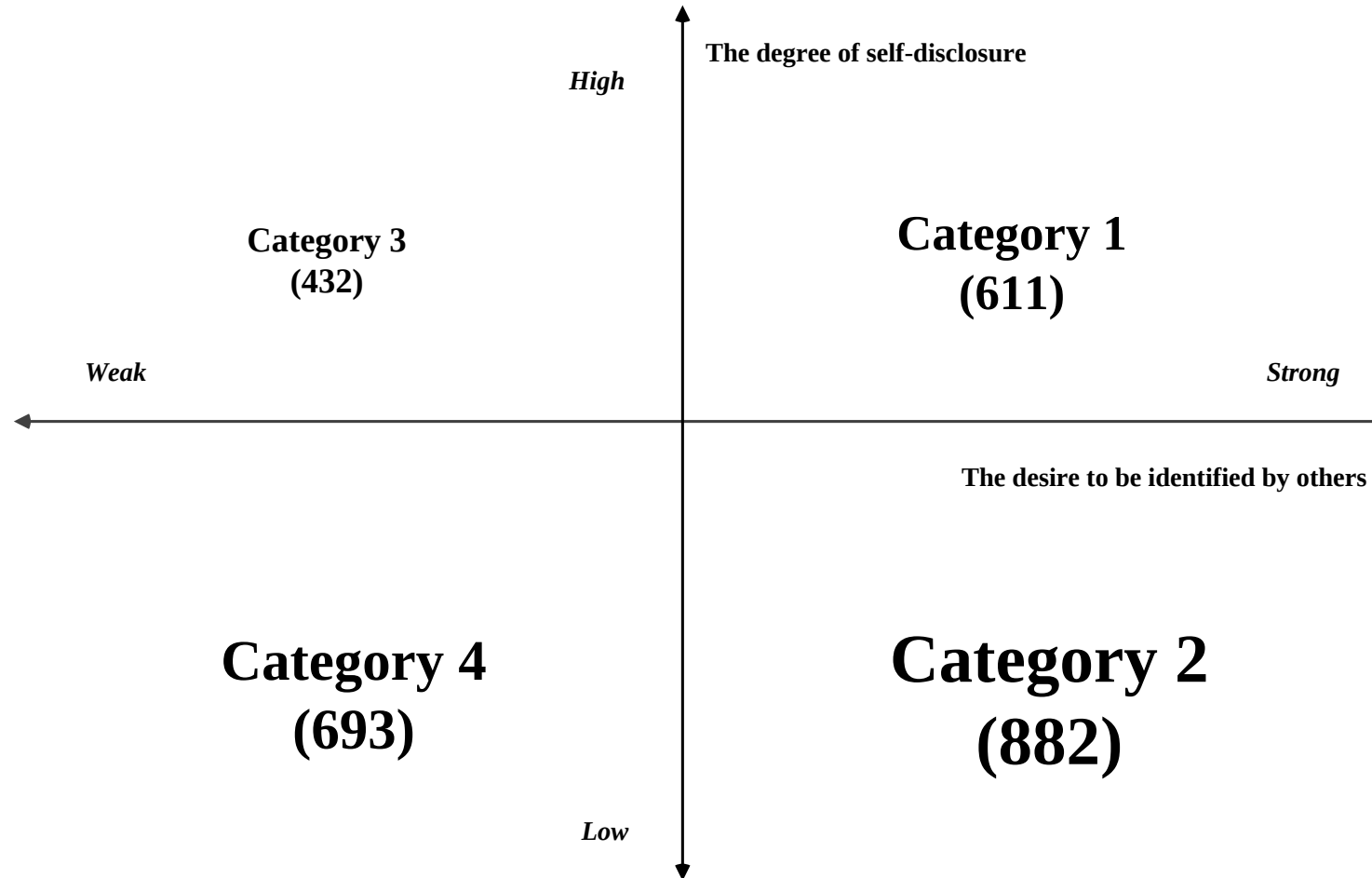
Comparing the variations of the knowledge attributes across the four categories

- ❖ Three times of one-way ANOVA test
  - ❑ One factor with four levels (*one-way*)
    - A classification of knowledge influencer with four categories
  - ❑ Three response variables (*three times*)
    - Knowledge quantity
    - Knowledge quality
    - Knowledge diversity
- ❖ Tukey's Honestly Significant Difference Post-hoc
  - To be employed if the variance is statistically significant across the four categories

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## RESULTS

# 1. Four Categories of Knowledge Influencers



## 2. Online Identities Across Knowledge Influencers Categories

|                   | Topic labels                                                                                                                                                                                                                           | Online identities  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>Category 1</b> | Expertise & specialization; Reading and learning; Knowledge sharing; Critical thinking; Decision-making; Suggestions and advice; Ideas provision; Safety and healthcare; Teaching and supervision; Collections and arrangements        | <b>Mentor</b>      |
| <b>Category 2</b> | Problem-solving; Negotiation & discussion; Consultation; Online communication; Management & business; Experience sharing; Career; Safety and healthcare; Debate skills; News and public opinions                                       | <b>Broker</b>      |
| <b>Category 3</b> | Science and technology; Science popularization; Entrepreneurship; Innovation and service; Internet and social media; Data analysis & prediction; Computer sciences; Ph.D. and scientific research; Animals and plants; Science-fiction | <b>Geek</b>        |
| <b>Category 4</b> | Humorous and irony; Hobbies and interests; Experience sharing; History and culture; Humanity and society; Stories and narratives; Music & movie; Enjoyment and entertainment; Lifestyles; Photographer and painting                    | <b>Storyteller</b> |

### 3. Variations of Knowledge Attributes Across the Four Categories

Knowledge attributes across knowledge influencer categories

| Categories<br>Attributes | Mentor<br>(Mean $\pm$ SD) | Broker<br>(Mean $\pm$ SD) | Geek<br>(Mean $\pm$ SD) | Storyteller<br>(Mean $\pm$ SD) |
|--------------------------|---------------------------|---------------------------|-------------------------|--------------------------------|
| Knowledge quantity       | 78.796 $\pm$ 103.895      | 74.927 $\pm$ 105.219      | 66.432 $\pm$ 88.544     | 63.517 $\pm$ 97.462            |
| Knowledge quality        | 13.826 $\pm$ 14.562       | 10.099 $\pm$ 9.762        | 12.358 $\pm$ 13.011     | 8.253 $\pm$ 10.229             |
| Knowledge diversity      | 27.213 $\pm$ 7.099        | 36.128 $\pm$ 12.461       | 28.997 $\pm$ 7.602      | 33.741 $\pm$ 22.513            |

Results of Tukey's honestly significant difference post-hoc test.

| Categories of<br>knowledge<br>influencers ( <i>i</i> ) | Categories of<br>knowledge<br>influencers ( <i>k</i> ) | Mean differences ( <i>i</i> - <i>k</i> ) |                   |                     |
|--------------------------------------------------------|--------------------------------------------------------|------------------------------------------|-------------------|---------------------|
|                                                        |                                                        | Knowledge quantity                       | Knowledge quality | Knowledge diversity |
| Mentor                                                 | Broker                                                 | 3.869*                                   | 3.727*            | -8.915*             |
| Mentor                                                 | Geek                                                   | 12.364*                                  | 1.468*            | -1.784 (n.s.)       |
| Mentor                                                 | Storyteller                                            | 15.279*                                  | 5.573*            | -6.528*             |
| Broker                                                 | Geek                                                   | 8.495*                                   | -2.259*           | 7.131*              |
| Broker                                                 | Storyteller                                            | 11.410*                                  | 1.846*            | 2.387*              |
| Geek                                                   | Storyteller                                            | 2.915*                                   | 4.105*            | -4.744*             |

Note: \* $p < 0.05$ ; n.s. means statistically nonsignificant

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## CONCLUSION

# Findings

- **RQ 1:** *What are the online identities of knowledge influencers presented on pay-for-knowledge platforms?*
  - ☐ Mentors
  - ☐ Brokers
  - ☐ Geeks
  - ☐ Storytellers
- **RQ 2:** *Are there variations in knowledge attributes across knowledge influencers with different identities?*
  - ☐ Knowledge quantity
    - Mentors > Brokers > Geeks > Storytellers
  - ☐ Knowledge quality
    - Mentors > Geeks > Brokers > Storytellers
  - ☐ Knowledge diversity
    - Brokers > Storytellers > Geeks > Mentors

# Implications

## Theoretical implications

- ❖ Contributing to the literature on online influencers by showing a classification of knowledge influencers
- ❖ Empirically examining the existence of different categories of knowledge influencers
- ❖ Validating the variations of the knowledge attributes across different categories

## Practical implications

- ❖ Platform operators should offer the most suitable functionalities that afford them to show off their unique identities
- ❖ Platform operators can design a reputation mechanism to highlight the distinct advantages in knowledge attributes across different categories

## Next Steps

### The economic gains among them

- ❖ To explore the potential variances of the economic gains across knowledge influencers categories
- ❖ Ref: Guo, Guo, Fang, & Vogel (2017)

### The dynamic changes among them

- ❖ To use a longitudinal investigation to study whether knowledge influencers could change their online identities
- ❖ For example: *Can storytellers in the first phase become mentors in the next phase?*
- ❖ Ref: Chen & Chen (2011)

### The impact of their online identities

- ❖ To investigate the impact of their online identities on users' payment intention
- ❖ Ref: Ambuehl & Li (2018)

- Ambuehl, S., & Li, S. (2018). Belief updating and the demand for information. *Games and Economic Behavior*, 109, 21-39.
- Chen, R., & Chen, Y. (2011). The potential of social identity for equilibrium selection. *American Economic Review*, 101(6), 2562-8259.
- Guo, S., Guo, X., Fang, Y., & Vogel, D. (2017). How doctors gain social and economic returns in online health-care communities: a professional capital perspective. *Journal of Management Information Systems*, 34(2), 487-519.

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## Thanks For Your Attention!

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