



# **An Investigation of Cultural and Organizational Impacts on EKR Use and EKR Use Outcomes Among System Administrators at NASA**

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<https://www.usenix.org/conference/lisa14/poster-session/poster/forsgren>

**This paper is included in the Proceedings of the  
28th Large Installation System Administration Conference (LISA14).**

**November 9–14, 2014 • Seattle, WA**

ISBN 978-1-931971-17-1

**Open access to the  
Proceedings of the 28th Large Installation  
System Administration Conference (LISA14)  
is sponsored by USENIX**

# An Investigation of Cultural and Organizational Impacts on EKR Use and EKR Use Outcomes Among System Administrators at NASA\*

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## Abstract

Organizations develop and implement Electronic Knowledge Repositories (EKRs) to support the codification, storage and reuse of knowledge. EKRs are seeing increased use in expert technical professions, such as system administration. Sysadmin.nasa.gov is such an EKR, initiated and supported by a grass-roots group of security and system administrator (sysadmin) professionals. The site supports several tools including a wiki, code repository, ticketing system, mailing lists and chat server to allow sysadmins to collaborate effectively across geographically distributed NASA centers.

Despite the increasing popularity of EKRs, an EKR is only as useful as the knowledge it holds. Referencing self-determination theory (Deci & Ryan 2000), the motivation-opportunity-ability framework (MacInnis et al. 1991), and the theory of knowledge reuse (Markus 2001), we include factors in our study that influence knowledge contribution to the EKR and knowledge sourcing from the EKR, as well as the impacts of EKR use on perceived work efficiency and effectiveness. Using a cross-sectional survey of 44 system administrators, we conducted our analysis of the use of an in-development EKR system in three steps, investigating (1) the effects of organizational culture and processes on sysadmin motivation to use the EKR; (2) the effects of motivation, costs, and technical factors on EKR use; and (3) the effects of EKR use on outcome measures, such as perceived performance. Overall the use of an EKR was found to be a net positive where, with proper support from management and consistent messaging, end-users were willing to share and use the tools and information. These findings are likely to generalize to similar organizational knowledge systems used by sysadmins.

*The effects of organizational culture and processes on sysadmin motivation to use the EKR:*

- If organizational rewards are associated with EKR use, messaging and support from management is key.
- Shared understanding of expertise and norms among sysadmins reduces the amount of satisfaction that comes from sharing knowledge through the EKR.
- The visibility of page ratings in EKRs contributes to the importance of extrinsic rewards.

*The effects of motivation, costs, and technical factors on EKR use:*

- While feeling time pressure reduces EKR use, sysadmins are still willing to spend time sharing knowledge with the system.
- Personal satisfaction with sharing knowledge contributes to EKR use; messages about sharing knowledge as a key aspect of being a sysadmin will increase EKR use.
- Consistent messaging and support from management is the most effective way to increase EKR use.
- System quality and usefulness positively impacts EKR use; any investments in EKR interface and search development will increase system use.

*The effects of EKR use on outcome measures, such as performance:*

- Sysadmins perceive efficiency and effectiveness gains from EKR use.
- The use of knowledge from external sources (such as web searches or vendor documentation) reflects negatively on the perceived value of early implementation EKRs. Continued support for EKRs is key in early rollout stages.
- Colleagues are seen as a complementary (not competing) knowledge source to EKRs.

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\* This work supported by NASA Langley Research Center Information Technology Enhanced Services (LITES) under Task Number A111.

## References

- Deci, E.L., & Ryan, R.M. (2000). The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior, *Psychological Inquiry*, 11(4), 227-268.
- MacInnis, D. J., Moorman, C., and Jaworski, B. J. 1991. "Enhancing and Measuring Consumers' Motivation, Opportunity, and Ability to Process Brand Information From Ads," *Journal of Marketing* (55:1), pp 32-53.
- Markus, M. L. (2001). Toward a Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success. *Journal of Management Information Systems*, 18(1), 57-93.