What Makes a Great Manager of Software Engineers?

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ABSTRACT

Having great managers is as critical to success as having a good team or organization. A great manager is seen as fuelling the team they manage, enabling it to use its full potential. Though software engineering research studies factors that may affect the performance and productivity of software engineers and teams (like tools and skill), it has overlooked the software engineering manager. On the one hand, experts are questioning how the abundant work in management applies to software engineering. On the other hand, practitioners are looking to researchers for evidence-based guidance on how to manage software teams. We conducted a mixed methods empirical study to investigate what manager attributes developers and engineering managers perceive important and why. We present a conceptual framework of manager attributes, and find that technical skills are not the sign of greatness for an engineering manager. Through statistical analysis we identify how engineers and managers relate in their views, and how software engineering differs from other knowledge work groups.

CCS CONCEPTS

• **Software and its engineering → Software creation**;

KEYWORDS

Manager, Software Engineering, Knowledge Work, Empirical Study, Conceptual Framework, Manager Attributes, Technical Skills

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Case studies from diverse industries show that great managers make a significant difference in the performance of teams and organizations, while the wrong person in a manager role has detrimental effects on employee engagement, productivity, and the quality of produced results. As software development today is done in teams, managers are essential to organize the effort of creating good software and manage the people that carry it out. Though software engineering research studies factors that may affect the performance and productivity of software engineers and teams (like tools and skills), it has overlooked the software engineering manager.

Our research goal was to *understand how software engineering managers function and what is perceived to make them great.* Great managers positively impact motivation and engagement; we aim to raise awareness of these aspects, as they can affect software engineering outcomes, even if in a second-order manner. We looked for attributes that are perceived to *characterize* great software engineering managers, *how* and *why* these attributes are important, and how they are used specifically in this domain.

The study we reported in the paper [1] used a mixed methods approach. We conducted 37 semi-structured interviews with engineers and managers of varied demographics at Microsoft. We then used their input to create and deploy a survey to 3,646 engineers and managers, using a questionnaire grounded on contextualized information. We found that the engineering manager guides engineers to make decisions, motivates them, and mediates their presence in the organization. To that end, a sufficient level of technical knowledge is necessary but people management skills are critical for great software engineering managers. Comparing the perceptions of managers to engineers in our analysis, we found general alignment but also identified specific differences that can help tailor management approaches. Through a separate survey, we reviewed how the perceptions in software engineering relate to those in other knowledge worker groups. Identifying the similarities and differences between domains perceptions helps to understand what conditions are likely to make manager practices effective.

The paper [1] contributes a conceptual framework of fifteen attributes that characterize great engineering managers, as well as contextual examples of the attributes in action. It provides quantitative evidence about how the attributes rank in importance, what demographic differences exist, and how the findings from software engineering compare to other knowledge work domains.

REFERENCES

[1] Eirini Kalliamvakou, Christian Bird, Thomas Zimmermann, Andrew Begel, Robert DeLine, and Daniel M. German. 2017. What makes a great manager of software engineers? IEEE Transactions on Software Engineering (to appear). DOI:10.1109/TSE.2017.2768368