Emergent Leadership in Agile Teams–an Initial Exploration

Leonard Przybilla
Chair for Information Systems,
Technical University of Munich
Garching, Germany
leonard.przybilla@in.tum.de

Manuel Wiesche
Chair for Information Systems,
Technical University of Munich
Garching, Germany
wiesche@in.tum.de

Helmut Krcmar
Chair for Information Systems,
Technical University of Munich
Garching, Germany
krcmar@in.tum.de

ABSTRACT

The adoption of agile development methods is now widespread. A key aspect of the special type of teamwork promoted in agile methods is the proposition of self-organized teams without a formally assigned leader within the team. Contradicting this proposition, agile development is still in need of the outcomes of leadership such as coordination and facilitation of activities, which in turn drive performance. General group research has found leadership to emerge in an informal manner within leaderless teams. Integrating knowledge on governance in IT teams and general group research, we propose a first step to close the knowledge void on emergent leadership within agile teams and its effects on team outcomes. In this research-in-progress, we develop a conceptual model and deduct hypotheses on the emergence and effects of leadership in agile teams. We expect leadership to emerge informally within agile teams. Based on the propositions of agile development, we do not expect a single leader to emerge but leadership to be attributed to several team members. Given the different roles in agile development, this attribution may moreover differ based on different areas of reference. Drawing on extant knowledge of emergent leadership, we expect positive effects on performance if leadership is shared.

CCS CONCEPTS

Software and its engineering~Programming teams • *Software and its engineering~Software design engineering* • *Software and its engineering~Software design techniques*

KEYWORDS

agile software development; emergent leadership; agile practices; team dynamics.

ACM Reference format:

Leonard Przybilla, Manuel Wiesche, Helmut Krcmar. 2019. Emergent Leadership in Agile Teams–an Initial Exploration. In *Proceedings of SIGMIS-CPR '19, June 20–22, 2019, Nashville, TN, USA.* ACM, New York, NY, USA, 4 pages. https://doi.org/10.1145/3322385.3322423

SIGMIS-CPR '19, June 20–22, 2019, Nashville, TN, USA

ACM 978-1-4503-6088-3/19/06...$15.00
https://doi.org/10.1145/3322385.3322423

1. INTRODUCTION

With less than two decades since the proposition of the agile manifesto [21], the now pervasive use of agile practices in software development is quite staggering. In addition to practical acclaim, empirical results also lend support to the positive effects of agile development concerning e.g. communication [31] and overall project success [33]. A cornerstone of agile development is the special type of teamwork promoted by agile principles to e.g. put people over process [21], which has even been termed to constitute a culture [40]. More specifically, agile development has been described to influence general group dynamics such as the effects of subgrouping [32]. The proposition that teams should be self-managed, i.e. have discretion in decision making [28], without a formal leader within the agile team, reflects the special type of work organization.

The proposition of leaderless, self-managed teams is, however, peculiar since agile development teams are still very much in need of the functions traditionally fulfilled or supported by leaders to propel performance, e.g. coordination of dependencies [20, 36] or facilitating the work of team members [18]. While a facilitator may be present in e.g. Scrum as the Scrum master [34], this role is somewhat outside the team and explicitly excluded from planning tasks. With leadership outcomes such as decision-making at the center of agile self-organization (e.g. [9, 27]), it is peculiar that the question how the proclaimed self-management of agile teams is achieved within teams has received only scarce research attention [18, 23]. General group research has found informal leadership to be effective in promoting team outcomes such as communication and team cohesion [30], which also directly relates to the working style proposed to achieve effectiveness of agile teams. We seek to address the void in understanding the role of emergent leadership in agile by investigating whether and how leadership emerges within agile teams. We thus pose the following research question:

> In what form does leadership emerge within self-organizing agile teams and what are its effects?

To answer this question, we propose a theoretical model drawing on research in software development as well as on leadership in general group settings.

2. THEROETICAL BACKGROUND

2.1 Agile Self-Organization

A key proposition in agile software development is a focus on collaborative teamwork [21]. Credence is lent to this proposition by findings of improvements in team-level constructs in agile teams (e.g. [31]). Considerable aspects of this proposition are the call for self-organization in the team, including the ability to make decisions jointly, whereas traditional project management and leadership should not intervene [27]. As an example from the Scrum method, the only formally defined roles are the Scrum Master, who has a facilitative role somewhat outside the core development team, and the product owner responsible for representing customers [34].

Self-organization is, however, challenging for at least two sets of reasons: For one, enabling and instilling appropriate processes is challenging and secondly, the question how self-organization achieves the still-needed leadership outcomes arises. Transitioning to self-organization is described as challenging for both the team and the overarching organization [11, 28]. While self-organization is meant to replace formal leadership within the team, the need for leadership outcomes such as setting priorities, guiding work, coordinating dependencies and defining control strategies [15, 36] persists. Some of these functions are assigned to e.g. the Scrum master for facilitation [12]. Agile development generally encourages shared decision-making, in which all members have a say [27], which implies a somewhat structureless organization. Given the disconnect between the need for coordinated action and call for absolute self-management, the question whether and how informal leadership, which can help facilitate such outcomes [30], emerges within self-organizing agile teams.

There is, however, research related to aspects of leadership and its outcomes within agile teams. The investigation of six distinct roles in agile teams, which are dynamically reassigned based on context [18], provides in our view the most in-depth knowledge yet on how self-organization is achieved. In a theoretical view, applying control theory has highlighted context-dependent interactions of control modes with team effectiveness [22]. Self-referring clan control has been found to be improved through using agile practices [25].

Concerning outcomes of leadership in self-organization, coordination as the management of dependencies [20] has received, albeit limited, attention. In collocated agile teams, dimensions of coordination, their relation, and outcomes have been studied [36].

Relatively most research has been conducted in decision-making in agile teams. Team-shared decision making up to the strategic level has been put forth, yet is inhibited by several factors such as lacking resources [27]. In addition, group deficiencies may endanger quality such as members gaining disproportionate weight in discussions [13]. As a peculiar example of such a deficiency, the strongly emphasized cohesive nature of agile teams may endanger effectiveness by causing groupthink [24].

2.2 Emergent Leadership in General Group Research

Emergent leadership as team-internal leadership is not formally designated but emerges *within* the team [37]. Despite the lack of formal designation and formal mechanisms [30], it is important for performance [37]. Informal leadership improves team outcomes such as communication and community [30]. Despite the concept dating back decades, a relative lack of research has been identified [30]. Leadership as such, including emergent leadership, has been recently conceptualized as a relational phenomenon based on the leader attributions in social networks [6].

Emergent leadership has, however, been studied in areas linkable to agile development. In virtual self-managing teams, a concentration of leadership regarding tasks but democratic monitoring has been observed [5]. Moreover, emergent leaders have been found to exhibit specific behaviors auch as taking the initiative during setup or integrating work results [42].

Perceptions of leader- and followership as two types of leader-related identities have been described to emerge over time based on claims and grants of the respective status [10]. Leadership is found to emerge from cognitive ability and to a lesser extent from personal traits [37]. This result links to findings that members can emerge as de-facto leaders based on expertise [2]. Expertise-based leadership attributions have been found to be relatively stable when switching tasks but can be updated based on interaction and skill perceptions [7].

Results on the outcomes of emergent leadership are not fully conclusive but point to generally improved outcomes. While in sales teams, emergent leadership has not generally coincided with performance improvements, a distributed coordinated structure has performed markedly better [26]. A distributed leadership structure has been observed to boost performance beyond the effects of a single emerged leader [37]. To further differentiate, in self-managed virtual teams, shared leadership has been found to be positive for monitoring performance, whereas production is aided by a central structure [5]. Moreover, intermediate group outcomes such as communication are aided by informal leadership [30].

3. HYPOTHESES

We expect members within agile teams to emerge as informal leaders. Specifically, leadership is expected to emerge from attributions based on cognitive skill and being knowledgeable [2, 37]. Since we focus on leadership *within* the team, we expect salience of such knowledge in e.g. interactions [3] to be a driver of attributions.

Agile development fosters an environment of informal communication and considers feedback a central element [21, 41]. The proposed high level of interaction is also found empirically with agile practices improving communication [31]. We thus expect agile development to reinforce the tendencies of leadership emergence by providing fora for perceiving member skills. Drawing on knowledge on leadership for self-managing teams, a power-building orientation with a focus on facilitation through an

integrated and democratic leader [35] seems a likely structure. In IT settings, within-team leadership can only be built if the respective leader is an active part of the team [14], which is likely fulfilled in agile teams since "candidates" are within the team. Agile practices have also been found to facilitate the enactment of clan control [16, 25] as another group-based organization mechanism. Given agile development likely provides a fertile basis for perceptions of leadership to emerge, we propose:

H1: Perceptions of informal leadership emerge within self-organizing agile teams.

However, we do not expect only a single leader to emerge within teams. Frequently, more than one leader has been found to emerge [4]. While in virtual teams single leaders have been found to emerge based on specific organizational behaviors [42], in direct interaction attributions are updated based on skill perceptions [7]. Leadership is moreover based on setting and mutual history [6], which makes a relation to the specifics of cohesive agile teamwork palpable. The high degree of information exchange in agile development [21, 31] is known to foster e.g. empowerment [38], which constitutes a distinct self-management aspect. Combining these findings, it seems likely agile development provides many points to perceive the skills of others and come to develop a fine-grained ordering schema, which is regularly updated. While in some cases agile team members refrain from contributions in decision-making [8], empowerment of each member may make it more likely that members stand their ground and e.g. reject overly broad claims for leadership by others [10]. Based on these deliberations, we put forth:

H2: Emergent leadership within agile teams emerges in a shared form with more than one member perceived as leader.

In addition to being shared, we expect leadership to emerge differently based on function. Drawing on the finding that distinct roles emerge and are dynamically reassigned in agile teams [18], we expect leadership to also emerge differently based on the role under consideration. Beyond task-related roles, previous research has identified distinct leaders based on task or emotional focus [4]. It has been proposed that emergent leaders could fulfill a role of managing emotions [29], which relates to key agile principles. Agile development emphasizes feedback [41], which is also embedded in e.g. retrospectives. Sharing emotions is described as a key value of retrospectives [1], which makes the emergence of an emotional leader more likely. In summary, we thus propose:

H3: Leadership attributions within agile teams differ based on function.

Concerning the effects within agile teams, we expect positive influences of emergent leadership when it is shared. As stated before, extant research on performance effects is not fully conclusive but shows positive tendencies of emergent and overall shared leadership [4, 5, 26]. Drawing on the related area of virtual self-organized teams [5], we expect positive results of emergent leadership when there is no single leader but a distribution across members for at least some functions. This expectation is in line with the findings that emergent leadership is positive if shared and that a single leader cannot make up for little leadership in other members [37]. Emergence of a single leader may also be negative for performance since it would constitute an impediment for shared decision-making, which is emphasized in agile work [27].

On the other hand, decision-making as an antecedent to performance also illustrates the potential positive effect of emergent, informal leadership. The potential of groupthink [24] may be reduced if some members are attributed leadership – especially when due to expertise [2]. Emergent leadership from within the team with its transformational qualities [14] may attenuate lack of team orientation [27]. Moreover, emergent leadership may contribute to coordination [36] by members leading in the role of coordinator [18]. Taken together, we put forth:

H4: Emergent Leadership has a positive effect on performance when it is shared.

4. PLANNED METHOD

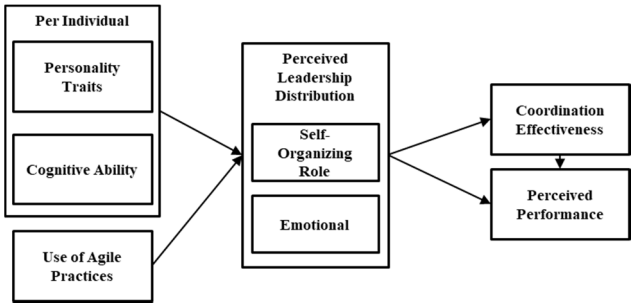

Figure 1 Overview of Survey Structure

We plan to test the proposed hypotheses in a survey study of agile teams as shown in figure 1. The survey is meant to be administered to all members and comprises both self-assessment as well as perceptions of others. Drawing on [37], self-assessment contains items from research on emergent leadership, i.e. cognitive skill as proposed in H1 and personality traits as control variables. In addition, use of agile practices [39] is measured since much of our argumentation rests on the operationalization of agile principles. To assess leadership perceptions of others and thus to test H1and H2, we plan to use a social network approach [3]. We plan to have multiple assessment dimensions, e.g. based on [18], to test H3 regarding differences of roles. Regarding outcomes, perceived performance [17] and coordination effectiveness [19] are to be included.

5. CONTRIBUTION AND CONCLUSION

The proposed study contributes to research in agile development and emergent leadership in general. By applying a tested theory from general group research that has been used in self-organizing teams [37], we contribute to the understanding of agile self-organization, which is described to be underresearched [18]. Specifically, knowledge on the emergence, distribution, and effects of emergent leadership can further knowledge on how effective outcomes can be achieved. Results can help to use agile development to its fullest potential.

Results from the specific context of agile development are moreover of interest to general group research since they provide

insights into a special, yet broadly applied type of work that may exhibit unique traits.

ACKNOWLEDGEMENTS

This research and development project was funded by the German Federal Ministry of Education and Research (BMBF) within the Program Innovations for Tomorrows Production, Services, and Work (02K14A080) and managed by the Project Management Agency Karlsruhe (PTKA). The authors are responsible for the contents of this publication.

6. REFERENCES

[1] Andriyani, Y., Hoda, R. and Amor, R. 2017. Reflection in Agile Retrospectives. *Agile Processes in Software Engineering and Extreme Programming* (2017), 3–19.

[2] Bonner, B.L., Baumann, M.R. and Dalalc, R.S. 2002. The effects of member expertise on group decision-making and performance. *Organizational Behavior and Human Decision Processes*. 88, (2002), 719–736.

[3] Carnabuci, G., Emery, C. and Brinberg, D. 2018. Emergent Leadership Structures in Informal Groups: A Dynamic , Cognitively Informed Network Model. *Organization Science*. 29, 1 (2018), 118–133.

[4] Carson, J.B., Tesluk, P.E. and Marrone, J.A. 2007. Shared leadership in teams: An investigation of antecedent conditions and performance. *Academy of Management Journal*. 50, 5 (2007), 1217–1234.

[5] Carte, T.A., Chidambaram, L. and Becker, A. 2006. Emergent leadership in self-managed virtual teams: A longitudinal study of concentrated and shared leadership behaviors. *Group Decision and Negotiation*. 15, 4 (2006), 323–343.

[6] Carter, D.R., Braun, M.T., DeChurch, L.A. and Contractor, N.S. 2015. Social Network Approaches to Leadership: An Integrative Conceptual Review. *Journal of Applied Psychology*. 100, 3 (2015), 597–622.

[7] Cook, A. (Sasha), Meyer, B., Gockel, C. and Zill, A. 2019. Adapting Leadership Perceptions Across Tasks: Micro-Origins of Informal Leadership Transitions. *Small Group Research*. 50, 2 (2019), 227–265.

[8] Coyle, S., Conboy, K. and Acton, T. 2015. An exploration of the relationship between contribution behaviours and the decision making process in agile teams. *2015 International Conference on Information Systems (ICIS): Exploring the Information Frontier* (2015).

[9] Coyle, S., Conboy, K. and Acton, T. 2013. Group Process Losses in Agile Software Development Decision Making. *International Journal of Intelligent Information Technologies*. 9, 2 (2013), 38–53.

[10] DeRue, D.S. and Ashford, S.J. 2010. Who will lead and who will follow? A social process of leadership effectiveness in organizations. *Academy of Management Review*. 35, 4 (2010), 627–647.

[11] Dikert, K., Paasivaara, M. and Lassenius, C. 2016. Challenges and success factors for large-scale agile transformations: A systematic literature review. *Journal of Systems and Software*. 119, (2016), 87–108.

[12] Dingsøyr, T., Moe, N.B., Fægri, T.E. and Seim, E.A. 2018. Exploring software development at the very large-scale: a revelatory case study and research agenda for agile method adaptation. *Empirical Software Engineering*. 23, 1 (2018), 490–520.

[13] Drury-Grogan, M.L., Conboy, K. and Acton, T. 2017. Examining decision characteristics & challenges for agile software development. *Journal of Systems and Software*. 131, (2017), 248–265.

[14] Eseryel, U.Y. and Eseryel, D. 2013. Action-embedded transformational leadership in self-managing global information systems development teams. *Journal of Strategic Information Systems*. 22, 2 (2013), 103–120.

[15] Faraj, S. and Sambamurthy, V. 2006. Leadership of Information Systems Development Projects. *IEEE Transactions on Engineering Management*. 53, 2 (2006), 238–249.

[16] Harris, M., Hevner, A.R. and Collins, R.W. 2006. Controls in Flexible Software Development. *Hawaii International Conference on System Sciences (HICSS)* (2006).

[17] Hinds, P.J. and Mortensen, M. 2005. Understanding Conflict in Geographically Distributed Teams: The Moderating Effects of Shared Identity, Shared Context, and Spontaneous Communication. *Organization Science*. 16, 3 (2005), 290–307.

[18] Hoda, R., Noble, J. and Marshall, S. 2013. Self-Organizing Roles on Agile Software Development Teams. *IEEE Transactions on Software Engineering*. 39, 3 (2013), 422–444.

[19] Kudaravalli, S., Faraj, S. and Johnson, S.L. 2017. A Configurational Approach to Coordinating Expertise in Software Development Teams. *MIS Quarterly*. 41, 1 (Mar. 2017), 43–64.

[20] Malone, T.W. and Crowston, K. 1994. The Interdisciplinary Study of Coordination. *ACM Computing*. 26, 1 (1994), 87–119.

[21] Manifesto for Agile Software Development: 2001. *http://agilemanifesto.org/*.

[22] Maruping, L.M., Venkatesh, V. and Agarwal, R. 2009. A Control Theory Perspective on Agile Methodology Use and Changing User Requirements. *Information Systems Research*. 20, 3 (Sep. 2009), 377–399.

[23] Matook, S., Soltani, S. and Maruping, L.M. 2016. Self-organization in agile ISD teams and the influence on exploration and exploitation. *2016 International Conference on Information Systems (ICIS)* (2016).

[24] McAvoy, J. and Butler, T. 2009. The role of project management in ineffective decision making within agile software development projects. *European Journal of Information Systems*. 18, 4 (2009), 372–383.

[25] McHugh, O. 2011. *A Study of Clan Control in Agile Software Development Teams*.

[26] Mehra, A., Smith, B.R., Dixon, A.L. and Robertson, B. 2006. Distributed leadership in teams: The network of leadership perceptions and team performance. *Leadership Quarterly*. 17, 3 (2006), 232–245.

[27] Moe, N.B., Aurum, A. and Dybå, T. 2012. Challenges of shared decision-making: A multiple case study of agile software development. *Information and Software Technology*. 54, 8 (2012), 853–865.

[28] Moe, N.B., Dingsøyr, T. and Kvangardsnes, Ø. 2009. Understanding Shared Leadership in Agile Development: A Case Study. *Hawaii International Conference on System Sciences (HICSS)* (2009).

[29] Pescosolido, A.T. 2002. Emergent leaders as managers of group emotion. *Leadership Quarterly*. 13, 5 (2002), 583–599.

[30] Pielstick, C.D. 2000. Formal vs. Informal Leading: A Comparative Analysis. *Journal of Leadership Studies*. 7, 3 (2000), 99–114.

[31] Pikkarainen, M., Haikara, J., Salo, O., Abrahamsson, P. and Still, J. 2008. The impact of agile practices on communication in software development. *Empirical Software Engineering*. 13, 3 (2008), 303–337.

[32] Przybilla, L., Wiesche, M. and Krcmar, H. 2018. The Influence of Agile Practices on Performance in Software Engineering Teams: A Subgroup Perspective. *Proceedings of the 2018 ACM SIGMIS Conference on Computers and People Research* (New York, NY, USA, 2018), 33–40.

[33] Serrador, P. and Pinto, J.K. 2015. Does Agile work? - A quantitative analysis of agile project success. *International Journal of Project Management*. 33, 5 (2015), 1040–1051.

[34] Shastri, Y., Hoda, R. and Amor, R. 2017. Does the "project manager" still exist in agile software development projects? *Asia-Pacific Software Engineering Conference, APSEC* (2017), 57–64.

[35] Stewart, G.L. and Manz, C.C. 1995. Leadership for Self-Managing Work Teams: A Typology and Integrative Model. *Human Relations*. 48, 7 (1995), 747–770.

[36] Strode, D.E., Huff, S.L., Hope, B. and Link, S. 2012. Coordination in co-located agile software development projects. *Journal of Systems and Software*. 85, 6 (2012), 1222–1238.

[37] Taggar, S., Hackett, R. and Saha, S. 1999. Leadership Emergence in Autonomous Work Teams: Antecedents and Outcomes. *Personnel Psychology*. 52, (1999), 899–926.

[38] Tessem, B. 2014. Individual empowerment of agile and non-agile software developers in small teams. *Information and Software Technology*. 56, 8 (2014), 873–889.

[39] Tripp, J.F.., Riemenschneider, C.K.. and Thatcher, J.B.. 2016. Job satisfaction in agile development teams: Agile development as work redesign. *Journal of the Association of Information Systems*. 17, 4 (2016), 267–307.

[40] Whitworth, E. 2008. Experience report: The social nature of agile teams. *Proceedings - Agile 2008 Conference* (2008), 429–435.

[41] Williams, L. and Cockburn, A. 2003. Agile Software Development: It's about Feedback and Change. *Computer*. 36, 6 (2003), 39–43.

[42] Yoo, Y. and Alavi, M. 2004. Emergent leadership in virtual teams: what do emergent leaders do? *Information and Organization*. 14, 1 (2004), 27–58.