Effective decision making during project implementation

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Abstract: Project leaders rely on the competence and knowledge of team members to implement successful projects in changing environments. Leaders mobilise knowledge and learning generated during project implementation to support team members' diverse expertise, integrate different stakeholder expectations, enable collective performance, and ensure project success. The paper presents a theoretical model that supports team knowledge and competencies within the project development effort through the mechanisms of interaction and feedback. It suggests that facilitating the flow of dynamic knowledge during project implementation improves decision making and team performance. Moreover, the proposed model has longer-term implications regarding project leaders' ability to manage context, provide feedback and support interaction.

Key words: Decision making, knowledge sharing, integration, performance, collaboration

1. Introduction

Leaders implement projects in rapidly changing and evolving environments characterised by high levels of uncertainty, volatility and ambiguity. Unpredictable and ill-structured operating conditions require dynamic resolution approaches supported by team competencies and performance. As leaders lay greater emphasis on people, relationships and interactions over processes and tools, collective knowledge increasingly underpins collaborative activities. Moreover, leaders are under greater pressure to achieve more with fewer resources, and this reality requires them to make effective decisions in order to achieve project success. Project leaders need to make effective decisions to achieve success, and therefore rely on dynamic knowledge available to support decision making during project implementation.

The complexities and unpredictability of unstructured situations require effective decision-making and creative problem-solving to ensure project success. Standardised processes identify good practices and reduce mistakes and rework, whilst reducing a project team's flexibility and ability to adopt new approaches for problem-solving which may result in vital learning. Knowledge needs to be available in a dynamic form to ensure that relevant shared contexts and interpretations create common knowledge and understanding in changing situations. The interaction and flow of dynamic knowledge is required within a project team's core work practices and behaviours to support effective decision making and facilitate project success. The flow of knowledge requires an effective knowledge strategy along with the mobilisation, integration, sharing, and application of knowledge in a dynamic manner. Within such a holistic knowledge approach, existing and created knowledge are mobilised and integrated, and made available for effective decision making. The need exists for a knowledge-based framework which addresses the requirements to facilitate the exchange and application of knowledge to improve team performance and make effective decisions.

The paper addresses the above gap by proposing a theoretical model that allows project leaders to make knowledge available through the supporting mechanisms of interaction and feedback. Specifically, the paper examines how knowledge available during project implementation can be mobilised and applied by leaders to make effective decisions, improve team performance, and ensure project success. The proposed model makes available and accessible dynamic knowledge that is applied for effective decision-making and problem-

solving, and allows project leaders to support the essential areas of activities that help in delivering the project vision. In doing so, the model suggests a capability to facilitate the flow of dynamic knowledge during project implementation and improve decision making and team performance. Moreover, the theoretical model has longer-term implications regarding project leaders' ability to manage context, provide feedback and support interaction.

2. Theoretical Model

Work has been done to understand knowledge creation, integration and sharing. [1] proposed a theory to explain the phenomenon of knowledge creation and sharing through the phases of socialisation, externalisation, combination and internalisation. The subsequent works of [2] and [3] built upon [1]'s theory, and these combined works conform to [4]'s view of theories as statements providing a lens for viewing or explaining the world. [5] assert that a theory is a fundamental set of propositions of how the world works, which have been subjected to repeated tests and in which we gained some confidence. Further, [6]'s method of theory building consists of the five phases of conceptual development, operationalisation, confirmation or disconfirmation, application, and continuous refinement and development. Based on the propositions of [1] work, [7] developed a knowledge management framework that defined processes for the creation, storage, retrieval, transfer and application of knowledge. This paper attempts to operationalise the main concepts of [1]'s and [7]'s work and apply them to understand and model the role of knowledge integration and flows in allowing leaders to make effective decisions essential for project success.

Models are simplified description of processes and therefore help in understanding the complexity and interactions between different entities. They help integrate the multiple functions of development processes and in the case of project implementation, models provide an understanding and structure for the activities of planning, controlling, staffing, designing, development and maintenance. Different models emphasise varying aspects of the development and implementation processes, and the model proposed below provides a continuous view and long term perspective of knowledge creation, integration and sharing interactions during project implementation.

Team members work together to implement projects as they demonstrate skills and use competencies and expertise while undertaking design and development work, and making decisions, [8]. The temporary nature of projects requires creative actions, practitioner experience, and ability of teams to apply knowledge and solve problems and make effective decisions during implementation. The type of knowledge required to implement a project depends upon the novelty and uniqueness of the required outcome, and the inherent uncertainty and unpredictability of the implementation environment. The ability to create, store, integrate, disseminate, and utilise knowledge and expertise is primary for collective team output. Knowledge provides tacit insights and judgment and explicit information that form the basis for better decision making during the development process. Moreover, the making of decisions in the development process requires knowledge integration, which involves social interactions among individuals using internal communication channels to transfer knowledge and arrive at a common perspective for solving problems. Collaborative linkages are the primary means of transferring specialised knowledge when team members work together [9], and doing so facilitates knowledge reuse and the recombination of existing knowledge, [10] and [11].

The common knowledge created while working together forms the basis for evaluating the performance of collective team outputs. Objective measures underpin collaborative activities and strongly influence the creation of common knowledge and its integration, [12]. Measures allow leaders to assess performance and the tangible benefits gained through people working together, and enable to impress the need for team members to be able to identify the value gained by sharing knowledge, and therefore learn and contribute to the effort. Collaborative activities form ties and are important for knowledge integration and researchers have long recognised the need for people to collaborate in order to perform and deliver successful collective outcomes [13] and [14]. [15] confirm that collaborative structures of cross-functional teams and processes of decision-making are important for solving novel problems and delivering team performance and collective outcomes. Leaders need to be able to identify

the areas of collaborative activities necessary to deliver performance and achieve project success, and therefore focus efforts to ensure the benefits of knowledge integration are achieved.

Furthermore, common knowledge forms the basis of an objective approach to integrate perspectives and expectations of different stakeholders. People working together need to be able to identify the value gained through common knowledge, and therefore learn and contribute to the effort to create an approach which aims to balance varying interests and perspectives. Distinct expectations and expertise need to be shared between diverse team members with a sufficient level of congruence to enable individuals to understand each other and work together towards their common goals from different perspectives [16]. Combining previously unconnected aspects or recombining previously associated aspects integrates knowledge [17], as stakeholder and team members realise that solutions and tasks are better achieved through dynamic interaction and feedback. In this way stakeholders and teams are likely to create new knowledge and engage in effective sharing and integration of knowledge to achieve their predefined goals. Thus, a clear understanding of the project aim and objectives can be achieved through, interaction, dialogue and negotiation, and enable integration of different stakeholder expectations and perspectives.

Collective team member knowledge forms the basis of decision-making and commitment to the project. Prior experience helps make effective and improved decision making [18], and knowledge support helps challenge assumptions and ensures appropriate choices are made during the project implementation processes. Decision activities include an analysis of the impact the project will have on the business and technical environment along with the possible risks involved in implementing the project. The analysis views the goals, scope and functionality of project development and implementation, and how they fit or respond to the existing processes with which they are required to interact. Risk analysis is conducted as part of the process and consists of the two traditional components of risk identification and prioritisation or projection. Identification tries to envision all situations that might have a negative impact on the project, while prioritisation involves analysing the possible effects and consequences of the risk in case it actually occurs. Projects require crucial decisions to be made and the consequent knowledge created can be further effectively applied in a dynamic manner when team members perform tasks that rely on their skills, expertise and competencies. Therefore, amassing and synthesising specialised knowledge from multiple sources has become an integral factor during decision-making processes.

The importation of new knowledge coupled with the recombination of existing knowledge provides information and knowledge that can be leveraged to improve decision-making, and lower performance risk. Decision-making in project management processes is often compromised when team members fall victim to the fallacy where benefits are overestimated and costs are underestimated. Mutual consideration of work process strengths and weaknesses allows individuals to identify requirements and capabilities for targeted work processes, predict what resources are needed to fulfil the requirements, and determine how best to deploy resources to optimise performance and minimise delays, [19]. The act of coordination is a knowledge integration activity that facilitates a common understanding of task objectives and the means to reach those objectives, [20]. Knowledge integration is realised by synthesising varying expectations and expertise during decision-making processes, and enables different views to be incorporated. Team members bring different sets of assumptions about optimal ways to proceed, prioritising different values and perspectives, which are integrated in the process to develop required solutions. With decision-making being central to their work, team members recognise that failure is an opportunity for understanding and learning to avoid mistakes, and it is therefore imperative to make an effort to support collective reflection.

The concepts and issues discussed above can be synthesised and grouped in the four functional areas of competencies, performance, integration and decision-making, and the relationships between these areas can be modelled in a dynamic manner to highlight the impact of interaction and feedback. An effective collaborative mechanism for modelling these knowledge based activities is to identify the flow of knowledge between the functional

areas, [21]. Knowledge flows influence the efficiency and scope of knowledge integration which [22] identified as critical for effective decision making. Effective knowledge flows facilitate the generation of common knowledge and its seamless coordination between team members. The flow of knowledge helps attain a level of integration efficiency relative to the scope of integration required, and facilitates the ability to make good decisions. It enables the diverse pool of team members to access, share and discuss knowledge uniquely distinct to each member, thus creating knowledge not possessed before which is vital for assessing different perspectives and developing solutions. Tasks that integrate perspectives are communal, and the flow of knowledge between individuals is essential to facilitate collaborative activities and foster complex knowledge transfer. The transfer process can slow down where the complexity of knowledge is determined by the degree to which it is tacit, and whether an individual is dependent on another for the transfer and acquisition of knowledge, [23]. Effective knowledge flows provide integrated, task relevant knowledge support from appropriate competence areas to balance multiple perspectives and stakeholder interests. Thus available knowledge and consequent collaboration help create a sense-making community who understand the interactions and synergy of workflows through a multi-perspective view of diverse knowledge competence areas.

The activities of knowledge creation, learning and reflection clearly play an important role in enabling team members to perform tasks and activities and implement projects. Knowledge created while planning and developing the project is applied to identify mismatches, while performing causal analysis and ensuring mistakes are not repeated, enhances learning and reflection. Such reflection is required along with the experience of previous development efforts while planning projects, and knowledge created in doing so, needs to be transferred and applied for improved decision making in future endeavours. Knowledge and learning gained through problem solving during decision making need to be applied while implementing projects, while the knowledge created and experience gained needs to be applied to integrate different stakeholder expectations. Thus a continuous and iterative flow of dynamic knowledge is facilitated while implementing projects and is represented below in Figure 1 below.

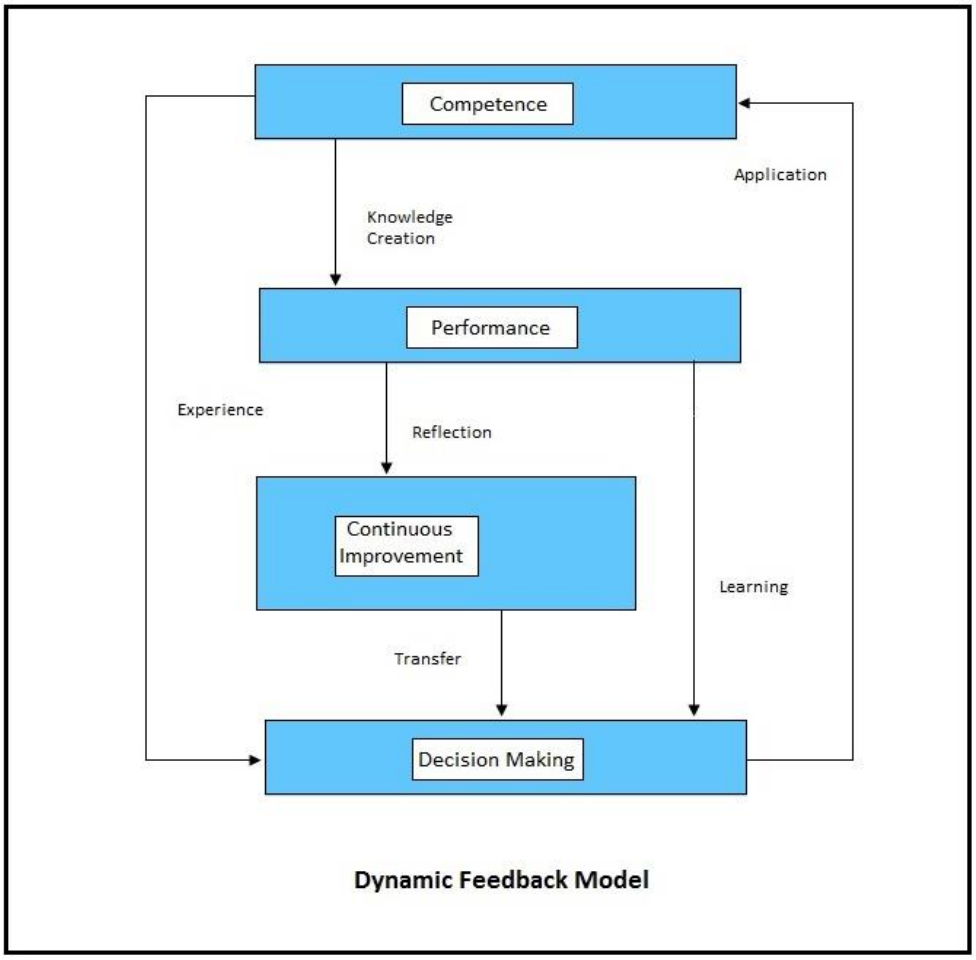

Figure 1

The relationships depicted in Figure 1 are in essence a set of interactions and feedback loops depicting software development activities from a continuous and dynamic perspective. The feedback cycles complete the dynamic loops that enable the functional areas to operate in a dynamic manner, and can be analysed in terms of causal-loop diagrams.

The *knowledge creation-learning-application* loop enables newly created knowledge and learning to be used to objectively view and measure collective team progress, performance and achievements. This loop is therefore concerned with new knowledge creation [1], learning [24] and [25], and the application of this new learning and knowledge, [26]. Therefore, this loop connects the functional areas of competencies, performance and decision-making. The loop enables the flow of knowledge created within the competence area to the performance area. Working together allows individuals with varying skills and expertise to solve problems and create knowledge in the process. Identifying new ways of working with others and reviewing performance, along with identifying good practice or taking corrective action, results in new learning, and the loop facilitates the flow of this learning to the decision making area. Learning from the performance area helps in subsequent decision making to avoid repeating mistakes, and further helps in preventive action by identifying and prioritising risks. The loop enables knowledge generated in the decision making area to be applied in the competence area during subsequent development efforts.

The *knowledge creation-reflection-transfer-application* loop facilitates interaction and flow of knowledge between all four functional areas. The loop enables project specific knowledge to flow from the competence area to the performance area. Review of work practices and corrective action in the performance area provides new insights and learning, which combined with the collective project knowledge further provides integrated knowledge that

needs to be deliberated, reflected and acted upon. The knowledge creation-reflection-transfer-application loop ensures that reflection [24] and [27], and translation is done in the integration area, where different expectations and interests are prioritised and balanced. The consequent effects of such integration are transferred to the decision making area where they are effectively implemented, and further reapplied in the competence area, through flows facilitated by the loop.

The *experience-transfer-application* loop facilitates interaction and the flow of knowledge between the competence, integration and decision-making areas. New knowledge is created while implementing the project and this knowledge integrates with the existing knowledge of individuals and team members. Such integration of knowledge enhances individual and collective team members' experience, [22]. The loop facilitates the flow of this experience [24], [25], and [27] to the integration area where existing assumptions and plans are challenged and validated. The insights gained by integration are transferred to the decision making area for effective application, and flow to the competence area to be subsequently reapplied in the implementation process. This loop depicts and highlights the dynamic nature of the flow of knowledge, and how knowledge flows while implementing projects can be effectively applied for effective decision making.

The feedback loops complete the set of interactions and interdependencies between the various functional areas, and enable new learning and knowledge to be available for integrating different expectations and effective decision making. The loops ensure that new knowledge integrates with existing knowledge in a dynamic manner, and experience gained while implementing a project is effectively transferred and applied to make improved decisions. Thus the model facilitates the flow of dynamic knowledge during project implementation and improves decision making and team performance.

3. Summary

The paper presents a theoretical model that provides long-term perspective for effective decision-making while implementing projects in environments of rapid and unprecedented change. The paper proposes that knowledge flows between functional areas can support collective team performance and tasks, and integrate different stakeholder expectations during the development effort. The model proposes a framework that emphasises dynamic knowledge support in the form of human judgement, insight, intuition, and experience, for decision making in the non-structured situations. The feedback loops presented in the model support collaboration, and integration of different perspectives and knowledge to create new common knowledge which can be applied for improved decision-making.

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