Balancing leadership in projects: role of the socio-cognitive Space

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To be referenced as:

Drouin, N., Müller, R., Sankaran, S., & Vaagaasar, A. L. (2021). Balancing leadership in projects: Role of the socio-cognitive space. *Project Leadership and Society*, *2*(December 2021). https://doi.org/https://doi.org/10.1016/j.plas.2021.100031

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Abstract

Balanced leadership has emerged as a contemporary theory of the dynamics in the continuous transfer of leadership authority between project managers and team members in projects. This article addresses the cognitive mechanisms for the coordination of this transfer. Four case studies in three different continents identified the most generic cognitive coordination mechanisms between project managers and team members. By building on and extending the concept of the socio-cognitive space, the study shows that empowerment, self-management, and shared understanding of skills needs govern and legitimize the question of 'who leads' at any point in time. The content of these three constructs varies contingent on the type of project management methodology used. A theory about the role of the socio-cognitive space in balanced leadership is developed and discussed.

Abbreviations:

SCS – Socio-cognitive space

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Introduction

Traditional leadership theory, in permanent organizations, described a contingency between the duration of a team's collaboration and their successful accomplishment of tasks (Hersey and Blanchard, 1988). However, long-term collaboration rarely happens in project teams, which are temporary organizations established to complete a project within a scheduled time, where members join for a particular task and adjourn after task completion (Tannenbaum, Mathieu and Cohen, 2012). Compared with teams in permanent organizations who have the time and opportunity to work together to perform (Tuckman, 1965), the traditional view of project teams suggests that these teams will find it difficult to reach their potential for productivity. This is because these organization are time limited and teams also join and leave the project as and when resources are needed.

However, balanced leadership theory offers an explanation as to why project teams can be performant even when facing frequent changes in team members. The theory claims that in projects, the leadership is not static but shifts in situational contingency to the best possible leader at any point in time. This dynamic makes the best use of the skills and attributes of project managers and team members for improved project results by appointing, for example, a team member with a specific skill and/or personality to solve a current issue (Pretorius et al., 2017). Hence, balanced leadership theory adds a new, time-based perspective to the prevalent research streams of person-centered leadership (i.e., appointed formal leader) and team-

centered leadership (i.e. emergent or distributed leadership or by appointed team members) (Pearce and Sims, 2002; Mailhot et al., 2016). Along with the identification of balanced leadership, the notion of *horizontal leadership* emerged, which describes a temporary leadership by a team member who is selected, authorized, and governed by the project manager during a leadership assignment. This type of leadership and its authorization through the project manager has been identified as particular to project settings (e.g. Author 2018).

Little is known about the mechanisms that drive and coordinate the transfer of leadership authority between the project manager and horizontal leader in balanced leadership. Understanding this phenomenon could provide a better understanding of who is required to lead at any point in time in a project. This simplifies the selection decision for a leader, smoothening the transition to a selected leader, and avoids false expectations on the part of team members about their own or other leader's appointments, along with all the associated emotional upheavals.

Authors (2015) conceptualized the coordination in balanced leadership as the socio-cognitive space (SCS), consisting of the shared understanding (between the project manager and team members) in terms of three elements: a) *empowerment* (i.e., who is empowered to lead); b) *self-management* (i.e., the extent the empowered leader possesses the skills and competencies to lead); and c) *shared mental models* about skills availability (i.e., which skills are available in the team). The present paper aims to empirically validate this model by investigating the role of the elements in the coordination of leadership transfer in different project types. From this, we aim to theorize on its functioning and to identify the boundaries of this theory. Hence, we ask the following research questions:

RQ1: How are the elements of the socio-cognitive space enabled in projects?

RQ2: How do the elements of the socio-cognitive space affect the balance of leadership in projects?

A phenomenological stance is taken in this qualitative, abductive, case-based study. Results provide insights for practitioners on how the SCS shapes balanced leadership. Academics benefit from understanding the functioning of balanced leadership in projects for the development of project-specific leadership theory.

Literature review

Vertical, shared, distributed, and horizontal leadership in projects

Vertical (or person-centric) leadership in projects is exercised by a formally appointed leader, such as the project manager (Authors 2017). Research on vertical leadership has mainly addressed leadership styles, such as transactional or transformational (e.g., Keegan and Den Hartog, 2004). A few studies have focused on personality factors and the fit between personality type and project type for project success (Williams, 2016), which implies a 'best fit' of leadership style and project situation. Following this, Dulewicz and Higgs (2005) mapped combinations of emotional, intellectual, and managerial skills of project managers to different leadership styles and their appropriateness in projects of different levels of change. This approach was expanded to a wide set of best-fit personality profiles for different project types in situational contingency, such as different levels of project complexity (Müller, Geraldi and Turner, 2012). In summary, the best fit between vertical leader personality and leadership situation in projects has been identified in many studies as the dominant mechanism for shifting leadership authority to a particular person (Turner and Müller, 2006).

Shared and distributed leadership, emerged as complements to vertical or positional leadership (Cox et al., 2003; Jones, 2014). These two leadership approaches imply leadership from within the team, based on either the agreement by the team to follow one particular member (i.e., shared leadership) or through the interaction between individual team members

and its resulting discourse (i.e., distributed leadership) (Bolden, 2011). Mechanisms that lead to the appointment of shared leaders include those stemming from the advantages of individual team members' strengths and leadership skills (Burke et al., 2003). More recently horizontal leadership has been identified as a project-specific type of leadership that is "executed by a team member upon nomination by the project manager (vertical leader) and governed by the vertical leader for the time of the nomination" (Authors 2019). Here, leadership authority is temporarily granted by the vertical leader (i.e., project manager) to a team member to solve a particular issue or handle a crisis. Mechanisms leading to this nomination include the vertical leader's decision that the chosen nominee is the most appropriate leader for the given situation (Pilkienė et al., 2018; Author 2018).

All these leadership types have their own strengths and weaknesses. For example, vertical leadership seems more suitable in dealing with emergencies (Pearce and Manz, 2005) or is more common in specific industries (Authors 2018). Shared leadership works well in temporary teams in a variety of contexts, ranging from emergency rooms (Klein et al., 2006) to change management teams (Pearce and Sims, 2002), and in situations that require tasks and personnel elements (Konradt, 2014). Horizontal leadership is suitable for situations requiring a team member's specific skill set to overcome an issue or crisis in a project (Author 2018). Leveraging the diversity of leadership types is critical to positive teamwork outcomes.

Balanced leadership

More recently, researchers investigated the particular circumstances in which leadership authority shifts between vertical, shared, distributed, and balanced leadership in projects (Author 2018). These investigations led to the theory of balanced leadership, which describes the back-and-forth transitions between these leadership approaches based on situational

contingency, to optimize efficiency in achieving project objectives. Balanced leadership theory defines five cyclic events: i) *nomination* (when resources are nominated as project team members); ii) *identification* (when potential horizontal leaders are identified by the project manager); iii) *selection* (empowerment of a horizontal/shared leader or team for distributed leadership); iv) *shared/distributed/horizontal leadership and its governance* (the ways leadership is exercised and governed by the project manager during the assignment); and v) *transition* (termination of the shared/distributed/horizontal leader appointment).

The above review shows that the mechanisms for appointing leaders are well understood for each of the four leadership approaches individually, but there is a gap about the coordination mechanisms that underlie the dynamic transition between the leadership approaches. This article addresses this knowledge gap in the context of transferring leadership authority from a vertical to a horizontal leader.

Theoretical lens: The socio-cognitive space

According to Bandura (1986), socio-cognitive theory links behaviors and cognition, and highlights the major role cognition plays in encoding and performing behaviors. It affirms that personal, behavioral, and environmental influences cause human behavior. A core concept for understanding individual behavior is triadic reciprocal causation (Bandura, 2002). It shows how behaviors may be reproduced through the interaction of the following three determinants: a) *Personal*: does the person believe that he/she can complete a behavior (self-efficacy); b) *Behavioral*: how does the person react to the response received after the behavior; and c) *Environmental*: how are environmental conditions conducive for improved self-efficacy by providing proper support (Bandura, 2002).

Authors (2015) interpret this socio-cognitive theory perspective in respect of leadership in

projects as temporary organizations (Turner and Müller, 2003), exploring the social and cognitive structures enabling balancing of leadership. The rationality behind the use of a socio-cognitive space is explained as follows. Authors (2015) propose that for leadership to shift back and forth between the project leader and one or more of the team members a space, i.e., a set of social and cognitive structures must be created where the linkage and adjustment between different leadership approaches take place. In this space, the understanding of who is empowered to lead must be shared. Once identified, the empowered leader's self-management capabilities are evaluated by the team members to chart the team's way forward with the appointed leader. To make sense of the current and possible future appointments, the team members and the project manager develop shared mental models about the skills required at any point in time in the project and map them against the skills available within the team. This results in three elements that constitute the SCS at the junction of vertical, horizontal, shared, and distributed leadership:

- *Empowerment* is supported by vertical leadership exercised by the project manager (Cox et al., 2003) through the sharing of power and decision-making authority (Leach et al., 2003), and taking on extended responsibilities (Conger and Kanungo, 1988). Empowerment also relates to the enabling of subordinates to take on responsibility by enhancing their efficacy (Conger and Kanungo, 1988). This means that the employee develops a perception of him/herself as having competence, autonomy, and impact, as well as their experience of meaningfulness in their work. This is often carried out in projects by helping the team member to acquire required capabilities to lead the task through building technical skills or by psychological empowerment to facilitate self-management (Grille et al., 2015).

- *Self-management of individuals* refers to a person's skills of self-administering (e.g., the individual can make decisions, solve problems, take actions) (Lorig and Holman, 2003).

A cornerstone of being accepted as a leader is an autonomous self-management or status by the team member (Abraham, 1997).

- *Shared mental models* are representations of knowledge elements in a person's environment along with the person's interrelations. For example, when knowing the particular skills and accessibility of each team member to sense when the transfer of leadership among team members needs to occur (Burke et al., 2003). Learning dialogs enable coordination within the team and allow the development and maintenance of shared mental models. Shared mental models also include the team members' perception and support about who is appropriate to lead in different situations. Often, teams come to know of each other's skills in projects during meetings, solving problems together or through communities of practice such as guilds.

The review above showed the emerging understanding of project leadership as shifting between vertical and horizontal/shared/distributed leadership. It introduced the concept of the SCS as a coordination mechanism for this to happen. While conceptually sound, empirical evidence for the existence of the SCS and its three elements is lacking. This is pursued in the present article.

Methodology

The study design followed the process of Saunders et al. (2009), which urges researchers first to define the underlying philosophy, then the theory development, research strategy, data collection methods, time scale, and scope, and finally, the analysis techniques. Accordingly, the study takes a phenomenological philosophical stance, which "assumes that reality is socially constructed' (Merriam and Tisdel, 2016:9).

A multiple-case design, using maximum variety sampling of cases, is used to identify the most generic underlying commonalities across the cases (Yin, 2009). Thus, the unit of analysis is the project. Variety in the cases was aimed for in terms of sectors, including utility, construction (private and public sector), financial services, and professional services. Data were collected from four case studies conducted in three countries – Australia (1), Canada (1), and the Netherlands (2) – to investigate the use of an SCS in five different projects – Canada (CASE 1: Project 1 / traditional method), Netherlands (CASE 2: Project 2.1 and Project 2.2 / Waterfall method, and Project 3 / Agile-scrum method), Australia (CASE 3; Project 4 / Agile method. We used 21 interviews, including senior managers, project managers, and team members. Semi-structured interviews were used for data collection in a cross-sectional setting, which allows collecting individuals' understanding of the phenomenon through the re-creation of their perceived organizational reality (Svensson, 2009). For improved reliability, interviews followed a case-study protocol developed and tested at the outset of the study. This protocol covered subjects such as: 1) general questions about the organization and the project; 2) questions about exercising leadership within the project; and 3) factors that facilitate or impede the establishment of horizontal and vertical leadership. The cases' analysis identified how the elements of the SCS (*empowerment, self-management, shared mental models*) were applied by project managers to build an SCS for balanced leadership in projects. Validity was pursued through constant comparison approaches, and coding techniques based on Miles, Huberman and Saldana (2014).

Data analysis

Based on the literature review, the balanced leadership theory and on the socio-cognitive theory, The data analysis approach was as follows. *Step 1* Relevant parts of the data for each

case were coded according to the core dimensions of empowerment, self-management, and shared mental models and put in Tables 2, 4 and 6. *Step 2*. Relevant parts of the data for each case were coded according to the core dimensions: balanced leadership, vertical leadership and horizontal leadership and put in Tables 1, 3 and 5. For example, in the Canadian case, CASE 1 / project 1 to support the presence of balanced leadership, authors identified the following quote 1: *"Based on their experience and knowledge, people were fairly autonomous in making decisions. They knew that they must comply with the project management practices of the company. There are decisions that cannot be taken by them. Thus, they know to whom to refer for approvals"*. In addition, data from each informant were organized separately to explore systematically the content of and the relationships between dimensions. Though coding relied mainly on these main themes, we were open to emerging and recurring sub-themes related to the specific context.

Step 3. To conduct cross-case analysis, the authors examined each case using Tables 1 to 6 to identify similarities, differences and patterns across cases. Results of this analysis are discussed in the conclusion. We use Table 7: Leadership approaches and their SCS in different types of projects to present the essential aspects of the four cases and Figure 1 (ternary diagram) to summarize the relationships of leadership approaches and SCS constructs for all cases.

Case study descriptions and analysis

The following section includes a description of each case. This is followed by an analysis of each case that highlights the presence of balanced leadership along with its vertical and horizontal leadership components. Subsequently, an evaluation of the three components of the SCS are also separately presented for each case.

CANADA: CASE 1: Project 1 / Construction

The Canadian company is a world leader in hydroelectricity, implementing projects worth billions of dollars based on well-defined project management practices. Project 1 is around C$500 million. It lasted ten years and, at its peak, involved a dozen people from the company plus sub-contractor teams. The on-site team consisted of one senior manager, one project manager, and team members for safety, contractor relations, engineering, and clerical functions. External stakeholders were mostly contractors and the team of the turbine manufacturer.

Leadership

The quotations related to this paragraph are listed in Table 1. The interviews identified contextual contingencies in dynamics between vertical and horizontal leadership. The senior manager and most of the team members were engineers, thus shared a common professional language and similar perspectives and understandings of issues, which fostered a climate of trust and mutual understanding. A well-organized and robust project management practice limits the flexibility of the team members in the decision-making process. While consultation is highly regarded, the person most accountable for the subject of the decision makes the final decision (see quote 1 in Table 1). Balanced leadership requires team members to have past experiences or acquire experience through the project to be considered for horizontal leader roles. It is also grounded on trusting team members who shared a common understanding of key issues to implement the project and a thorough knowledge of the internal approval steps.

Vertical leadership dominated in the organization. The project manager is the guardian of project results and is recognized as that by team members (see quote 2). He explained further that decision-making is hierarchical (see quote 3).

Horizontal leadership is limited to decisions on technical issues and related to daily tasks to conduct the project. For instance, according to a team member, engineering decisions will be the engineer's responsibility on-site. He/she is trusted based on his/her technical engineering expertise. The project manager will count on this person for these types of decisions. This expert will also work closely with engineers based at headquarters and are responsible for the whole design of the structure to validate it and discuss issues (see quote 4). The project manager explained that horizontal leadership is grounded on a shared understanding of roles and responsibilities (quote 5):

Other situations that called for horizontal leadership included brainstorming sessions for solving specific problems or emergencies that required immediate assistance by the safety manager and his/her team.

------------ Insert Table 1 here -----------------

The next section presents the key components of the SCS (empowerment, self-management, and shared mental models) that explain team members' enactment.
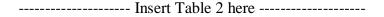

SCS components

The quotations related to this paragraph are listed in Table 2.

Empowerment. The senior manager manages a portfolio of major projects and delegates some leadership authority to the project manager and team members. Empowerment is enabled contingent on team members' competence and taking into account the framework of established project management practices of the company (see quote 6 and 7 in Table 2). However, empowerment comes within limitations set by professionalism and guidelines (quote 8).

Fostering self-management. Within existing project management practices, the project

manager recognizes team members' individual capabilities based on their experiences, roles, responsibilities, and established trust (quote 9). By delegating specific tasks to them, the project manager fosters their self-efficacy, and develops and supports their self-management (quote 10). Fostering self-management is closely connected to the team members' understanding of the company's project management practices and processes. However, it is also limited by these boundaries (quote 11), within which team members feel free to act autonomously (quote 12). This self-management is controlled and occasionally corrected by the project manager (quote 13).

Shared mental models are based on knowing the particular skills and accessibility of each team member to sense when the transfer of leadership among team members needs to occur (Burke et al., 2003). For this, the team members and the project manager explained that all decisions related to engineering issues are in the hands of the on-site engineer, who reports to the project manager and collaborates with the engineers at headquarters (quote 14).

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NETHERLANDS: CASE 2: Project 2.1 and Project 2.2 / Waterfall method and Project 3 / Agile-scrum method

The case organization is a large European airline with more than 100 destinations worldwide. The company is one of the oldest and most well-known airlines in Europe, working with passenger and cargo transport and aircraft maintenance. The projects addressed in this case study aimed to develop IT further for the organization's engineering and maintenance operations. We studied three projects at the interface between the airline's IT department and some of its stakeholders, such as suppliers, customers, and in-flight crews.

a) The first project (Project 2.1) was the implementation of an Enterprise Resource Planning system, which is a software that can help manage business activities across the

organization in a systematic manner. The system was based on software provided by SAP. The engineering and maintenance division has three primary markets: maintenance of aircraft; maintenance of engines; and maintenance or repair of broken components. The new SAP system replaced the mainframe system (older models of computer systems that used customized programs) of the latter division. The project was perceived as a regular SAP implementation, using a waterfall approach. Waterfall is a sequential approach that follows predefined steps (planning, defining, designing, building, testing and deployment). The team consisted of approximately 50 people, organized in six teams. The interview was held with the project manager.

b) The second project (Project 2.2), an external supplier's software package implementation and configuration project, included requirements definition, procurement, installation, and configuration for a joint software solution with allied airlines. A waterfall approach to project management was used, in conjunction with a steering group and a collaboration between a business project manager and a technical project manager.

c) The third project (Project 3) was a website development for customer interaction, which was part of the e-commerce unit and represented the organization's interface with customers. Development was done on a beta-version (early version for testing through limited use to detect any bugs) site, which will eventually replace the official website of the airline. The project was managed using an agile-scrum approach. Agile is an iterative methodology as opposed to the sequential process of the waterfall model, which has been taken up by software developers due to many failures in large software projects Scrum uses a specific form of teamwork in projects using agile methodology. It was named after the scrums used in rugby. When agile methodology is used, large pieces of software are broken down, developed, tested and delivered in a shorter time.

Leadership

Quotations related to this paragraph are listed in Table 3.

Balanced leadership was indicated in waterfall projects by frequent shifts of leadership authority between vertical and horizontal leaders (quote15). This shift is different from agile-scrum projects, where vertical leadership is used solely for giving initial structure, handling of human resource (HR) issues, and customer interfacing, but not for directing the technical solution. Hence, a balance between coordination and structure given by the vertical leader and technical solution development by the team (quote 16).

Vertical leadership. Managers of waterfall projects emphasized the need for initial control by them, followed by gradual hand over of the execution to the team (quote 17). This approach was contrary to the agile-scrum projects, where even the initial structuring is left to the team, and vertical leadership is only called upon when the team asks for guidance or for HR and business decisions (quote 18).

Horizontal leadership dominated the execution of projects, albeit with gradual differences. In waterfall-driven projects, this leadership worked within the structural limits set by vertical leadership, such as personnel and their role assignments (quote 19), integrated with the vertical leader's level of trust (quote 20). Agile-scrum projects showed less role awareness and a higher level of team spirit in their horizontal leadership (quote 21).

----------------------- Insert Table 3 here ---------------

SCS components

Quotations related to this paragraph are listed in Table 4.

Empowerment took place in different ways in the waterfall and agile-scrum teams. In the former, empowerment focused on the individual and his or her empowerment into a horizontal leadership role, hence was explicit in action and visible to the entire team (quote

22). In the latter, empowerment focused on the team as a whole and empowerment by the team itself. This dual effort reinforced self-sufficiency in taking on leadership authority as a team (quote 23).

Self-management also varied between the two project types**.** In waterfall projects, past experience and individuals' existing reputation played a major role in evaluating their self-management (quote 24). In contrast, agile-scrum teams focused on the self-management within the present project, with less focus on past accomplishments (quote 25).

Shared mental models and their development showed the most differences. In waterfall projects, the shared models were built using the initial project plan and the resources assigned at that time (quote 26). Agile-scrum teams built upon the tasks and the people executing these tasks as the project unfolded. In other words, the waterfall teams built their shared mental models along the lines of a *being* ontology, while agile-scrum teams were more aligned with a *becoming* ontology (quote 27).

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AUSTRALIAN: CASE 3: Project 4 / Agile method

The organization is a major financial services company in Australia with close to A$100 billion in assets and employing more than 15,000 people. Their business services are in banking and several types of insurance and wealth management products. The people interviewed in this organization had been members of a major IT-based business transformation project that was estimated to cost more than A$300 million. In collaboration with a major technology partner, the project lasted two years and employed close to 600 people at its peak. Work was also outsourced to offshore service providers but managed centrally from Australia. The project aimed to increase efficiency, speed up transactions, and make better use of business intelligence. The primary methodology used by the organization

was agile due to its heavy IT emphasis. While the organization did not use a large-scale Project Management Office or PMO (a group or department often responsible to define and maintain project management standards in the organization to help improve project results) to support their project management capabilities, sponsors from the top of the Technology and Business areas supported the project.

Leadership

Quotations related to this paragraph are listed in Table 5.

Balanced Leadership. In project 4, the organization promoted both vertical and horizontal leadership to take place collaboratively due to the project methodology being predominantly agile. The main project was a large software program carried out by four groups of internal specialists (system architects, business analysts, developers, and testers), as is often the case in software development, a major external technology partner providing the software platform, and an outsourced office performing software work. The project had the functional managers (such as architects, business analysts and engineers) adopting a vertical leadership role along with the project or delivery manager. This did create tension as to who the project managers should report to (team leaders of specialist functions or the executive team). However, the organization expected project managers to be focused on delivery and the specialist team leaders to support both vertical leadership (by the project manager) as well as by the horizontal leader (within the project team) (quote 28). The project team included technologists from the technology partner and team leaders from offices to which parts of the software development were outsourced (quote 29 and 30). Another characteristic of the organization was that collaboration also occurred between teams (quote 31). The senior leader expected the project manager to demonstrate strong leadership in the face of uncertainty (quote 32). The horizontal leader echoed the views of the senior leader on how leadership

operated in the organization. The projects in this organization went through a "discovery phase" followed by the "delivery phase". Senior management gets involved more during the discovery phase where concepts are discussed. In the delivery phase, the involvement is dependent on the scale of the project. Agile sliders, which are visual aids to prioritize project and product dimensions, are used to evaluate options (quote 33).

Vertical Leadership. The vertical leader for the project had a business background and was dependent on the technical knowledge of the team members. Therefore, he had to establish a climate for the team members to take on leadership on issues they were knowledgeable about (quote 34). He believed there were two key roles he had to perform – one was to protect the team from external interference, and the other was to make tough decisions when external circumstances required major intervention, such as when resource limitations were reached due to organizational changes (quote 35, 36 and 37).

Horizontal Leadership. The horizontal leaders generally took technical decisions on their own but respected senior management direction (quote 38). The vertical leadership (which included the project manager and functional leader) was consulted when there were multiple options for delivering solutions (quote 39). Another horizontal leader confirmed the division of decision-making by stating that when business requirements have an impact, the vertical leadership needs to be involved (quote 40).

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SCS components

Quotations related to this paragraph are listed in Table 6.

Empowerment. Due to the collaborative nature of the environment, a culture of empowerment was created in the organization. This enabled horizontal leaders to go ahead with a task when they felt they could lead it. People felt empowered to contribute at meetings (quote 41) and

during collaborations (quote 42). The organization also practiced a "no blame" culture (quote 43).

Fostering self-management. The organization had several processes to build up the capability of team members that included induction, buddying with others, and volunteering to attend training programs to brush up skills (quote 44). Horizontal leaders explained how they learned to be skillful in acquiring the knowledge required in the organization even though they came from a different type of business (quote 45), and how the organization's mentoring program worked for them (quote 46). An interesting point was put forward by one of the horizontal leaders on how people managed their own responsibility to make good decisions using the notion of a "technical debt". This refers to cost incurred through rework by choosing an easy solution that takes a shorter time to implement, which you owe when you contribute to a wrong decision (quote 47).

Shared Mental Models. The way people came to know who to go to happened in a variety of ways. There was published information as well as informal processes that encouraged people to know about the skills of others. Newcomers were also given free advice on expertise within the firm (quote 48). The guilds and chapters within the organization enabled the formation of communities of practice. These became more important towards the end of the project when the organization was restructured (quote 49).

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Discussion

The analysis shows different expressions of leadership approaches and their associated SCS elements in different types of projects.

CANADA CASE 1: Project 1 /Construction projects using traditional methods

Construction projects using traditional approaches showed relatively low levels of balanced leadership, as the vertical leader bears most of the leadership responsibilities. Horizontal leadership was inhibited, as all decisions and leadership responsibilities must be formally handled by the vertical leader. This type of leadership is associated with an SCS where empowerment is perceived as indirect, typically by the vertical leader asking a team member for help on an issue and then formally conveying the message as the official decision by the vertical leader. Self-management of those resources is formalized by the vertical leader by assigning them roles upfront according to the project plan to prepare them for their roles and develop their self-efficacy. Shared mental models were very rudimentary, as a reference is typically made to the project plan and to experts in their field. Hence, the expression of the three elements of the SCS was present at a minimum level, as the project plan took precedence over team members' opinions.

NETHERLANDS: CASE 2: Projects 2.1 and 2.2 / IT projects using Waterfall methods

Balanced leadership approaches dominated these project types. They needed to set and adjust structures and plans through vertical leaders, while horizontal leaders led teams working on technical solutions. This called for continuous interaction between vertical and horizontal leadership, typically in a complementary mode, to allow for the cohesion of structure and execution, all held together by the vertical leader. Accordingly, vertical and horizontal leadership were only part of the whole picture, and the dynamics between them became the dominating style. The related SCS emphasized the empowerment of individuals as horizontal leaders. Their self-management capabilities were typically judged by the team based on criteria including past accomplishments, experiences before the current project, and the individuals' reputation in their area of expertise. The shared mental models were based on the existing project plans, assuming that the resources and skills were available according to plan.

This mental reference to the project plan as the 'project reality' is indicative of an underlying 'being' ontology towards the project. The implications of this are discussed further on in this article.

NETHERLANDS: CASE 2: Project 3 / IT projects using agile-scrum method

This project type showed medium levels of balanced leadership, as most of the technical project leadership was carried out through horizontal leadership, but a certain amount of vertical leadership was needed in the form of initial structuring, business, and HR issues handling. This required a medium level of dynamic interaction between vertical and horizontal leadership. Pure vertical leadership was minimized, as the team took most of the vertical leader decisions. This made horizontal leadership the dominating leadership approach in these projects. Accordingly, the expression of the elements of the SCS shows an emphasis on team empowerment, which may even have been supported by the team's self-empowerment attempts. Self-management of team members and horizontal leaders was judged based on their performance in the current project and their contribution to it. Shared mental models were developed based on participants' experiences throughout the project, thereby not strongly determined by past events. Hence, the mental reference to the development within the team as the 'project reality' indicates a 'being' ontology.

AUSTRALIAN: CASE 3: Project 4 / IT projects using agile methods

This project showed that vertical leadership was shared between the project manager and the functional manager leading the specialists who worked on the projects. A collaborative culture and the use of agile methodology within the firm enabled the sharing of problems within and across teams. Horizontal leadership was actively promoted in a top-down fashion. It was also necessary, due to the technical nature of the project work, where technical tasks could be handled better by the horizontal leaders, as they were more knowledgeable about them. However, vertical leaders were consulted when there were several options, and when

business decisions required project manager involvement. While the vertical leaders tried to shield the team from external circumstances, they sometimes had to intervene in the tasks being carried out when external circumstances forced them to do so. The SCS was nurtured through the organizational culture. Team members were empowered to take on leadership roles. Their confidence was boosted through training, buddying, and mentoring so that their self-management capacity was enhanced. In general, it was known who the experts in the organization were through published experts' lists or through the grapevine. There were also communities of practice that helped to broadcast who the specialists were.

The cases discussed spanned industry sectors and project methodologies. The Canadian case was from the construction sector using traditional methods, which use sequential processes and are carried out in stages. The project studied was a core business for the organization. It was predominantly managed through vertical leadership, but horizontal leaders became involved when their knowledge became critical. The three elements of SCS received very little attention. Therefore, it was not surprising that there were very few shifts between vertical and horizontal leadership. The Dutch cases could be described more as part of a service industry, but the projects that were investigated were not for the core business but for supporting activities in the value chain – engineering and maintenance focusing on their software projects. The cases differed as two used waterfall while the other used agile methods. Despite using different methodologies, balanced leadership was prevalent. There were some differences observed in how vertical and horizontal leadership styles worked together. In the waterfall projects, horizontal leadership required trust from the vertical leader, whereas in the agile project, horizontal leadership was predominant and often based on the most suitable person to manage a task. As far as SCS elements were concerned, the empowerment approach differed with waterfall projects empowering individuals while agile

projects empowered teams. The horizontal leaders in the waterfall model required reputation, experience, and integrity, whereas in the agile projects, they showed more fluid and democratic approaches, allowing leadership to flourish. In the waterfall projects, recognizing other team members' capabilities was more formal and known at the start, whereas in the agile project, it evolved as the teams got to know each other better.

In the Australian case, agile was used as a corporate methodology in an industry that relied heavily on core software supporting the business. In the value chain for this industry (banking and insurance) software could be considered as part of the primary activities in a value chain rather than a supporting activity. Collaboration and sharing of leadership were actively encouraged at all levels. In contrast to the Canadian and Dutch cases, vertical leadership was shared between the project or program manager and leaders of technical specialists. Once the discovery phase was completed (when the project was reasonably well defined), the horizontal leaders took over the project with regular reporting and consultation with the vertical leader on business decisions or when one out of several options had to be selected. The SCS elements were all present, supported by the collaborative culture of the organization. Horizontal leaders were empowered, and developed capabilities in many ways. Identification of experts within the organizations was not difficult as teams could go outside the project boundaries to seek help. The information on who to go to was readily available. Table 7 presents a summary of the essential aspects of the four cases discussed.

----------------- Insert Table 7 here ------------

Conclusions

This study has addressed the role of the SCS and how its elements of empowerment, self-management, and shared mental models impact the expression of vertical, horizontal, and balanced leadership in projects. Four case studies in three different countries and continents

were done using variety sampling to identify the principal characteristics of the SCS elements across different project types. Data from 21 interviews were abductively analyzed until patterns emerged. The results help in answering the research questions.

RQ1 asked how the elements of the SCS are enabled in project work. The answer to this question can be found in the lower half of Table 7, which identifies the different enablers in different project types.

In projects with traditional methodologies, empowerment is enabled indirectly, as it is implied from the project plan and the reputation of the candidate being empowered. Similarly, self-management sets in and controls the team members (and possible horizontal leaders) contingent on the particular role that the vertical leader assigns to them. Shared mental models are mainly created and maintained through the project plan.

The enablers work differently in projects using waterfall methodologies. The understanding of who is empowered to lead comes from the direct appointment of a horizontal leader by the vertical leader. Team members judge the self-management capabilities of the candidate by referring to his/her past performance and reputation. The related shared mental models about the skills needed and their availability derive from the project plan. A commonality of balanced leadership in both traditional and waterfall driven projects is the underlying 'being' ontology. In both project types, the project plan provides an accepted objective reality, which is assumed to serve as the basis for leadership decisions in the 'real world'. Hence, the basis for decision-making and appointment of horizontal leaders is the project plan.

Agile projects showed a different pattern. Vertical leaders directly empower teams (or sub-teams), instead of individuals, to solve issues and function as horizontal leaders. Hence, empowerment is enabled at the team level. The monitoring and judgment of the empowered team and its members' self-management capabilities is based on the current performance of the team, not on past performance or reputation. This is supported through training,

mentoring, and other development measures. Accordingly, the shared mental models are created and maintained in line with the team and its current performance, rather than the formal plan as in traditional projects. Identification of required skills happens along the unfolding of work in the empowered teams. Appropriate experts are sought by consulting existing records, personal referencing, or investigating into communities of practice. Hence, enablers for the SCS elements in agile projects show the characteristics of a 'becoming' ontology, whereby the shared understanding of the project situation provides for the currently accepted subjective reality of the project which, in turn, acts as the basis for decision-making and leadership actions. This understanding of the current situation is dynamic and can change at any time in the project.

RQ2 asked how the SCS elements affect the balancing of vertical and horizontal leadership in projects.

This question is answered in reference to the left side of Fig. 1, which shows a ternary diagram for visualization. These diagrams display the relative proportions of three possible categories of data in a population, in this case, leadership approaches (vertical, horizontal, and balanced). The categories must be mutually exclusive and collectively exhaustive. Traditional, waterfall and agile projects are mutually exclusive and are the main representatives in the span of a variety of methodologies. The information from the upper half of Table 2 is plotted in the ternary triangle in Figure 1.

Figure 1 shows that projects using traditional methodologies (project 1 in Table 2) are low in balanced and horizontal leadership but high in vertical leadership. Waterfall-driven projects (projects 2.1 and 2.2 grouped under project 2 in Figure 1) are high in balanced leadership and medium in horizontal and vertical leadership. Agile covers a range of methodologies, and therefore also a larger area in the ternary diagram. They span from low to medium in vertical,

and medium to high in balanced leadership. Scrum, as one particular agile method is characterized by medium balanced, as well as low vertical and high horizontal leadership.

The relationship with the elements of the SCS is shown on the right side of Figure 1. The more the SCS dimensions tend towards teams for empowerment, in-project performance as a measure of self-management, and team's perception of the project reality as a shared mental model (hence, along the lines of the up arrows), the more the SCS is based on a becoming ontology. Here the reality is subjectively constructed among team members and leadership responsibility moves towards teams that focus on solving the issues at hand, based on their situational understanding of the project (more agile approaches).

The more the enablers of the three elements tend towards the down arrows, the more waterfall or traditional environments prevail. Here, individuals are empowered based on their past performance and in accordance with a predeveloped project plan. However, large differences exist in terms of balanced leadership. While almost non-existent in large construction projects (project 1), it is the dominating leadership approach in non-agile software and product development projects (projects 3 and 4). The nature of the relationship between the status of the SCS elements and the traditional/waterfall projects indicates a being ontology, where project reality is abstracted from the project plan and leadership and decision-making related to a predeveloped plan of tasks and their linkages.

The dashed line indicates the ontological divide between these project types and how it affects the choice of vertical and horizontal leadership.

------------------Insert Figure 1 here -----------------

The findings have implications for academics and practicing managers. For the former, they contribute to a better understanding of the contextual contingencies for balanced leadership. Here, theory development should emphasize the importance of contextual factors for balanced

leadership to happen. Its strongest expression is in waterfall projects. These projects are often product or service development projects of reasonable size, where a limited number of team members know each other and can shift leadership authority when needed to the best possible person to solve an issue. This is different from large construction projects, where the complexity of subcontractors and large teams, together with legal obligations, prevent such informal and ad-hoc transfer as in waterfall projects. Agile projects provide yet another type of context, characterized by dynamics and flexibility, where teams solve issues as they emerge, often without specific upfront planning. Hence, different leadership theories apply in different contexts, with the SCS acting as the interface between the project type and leadership style chosen. This could be a reason why servant leadership is found to be more effective in agile software development (Holtzhausen and de Klerk, 2018) while rarely discussed in conventional waterfall project management.

Managerial implications from this study include the deliberate choice of leadership approach, contingent on project methodology. Hence, project managers can verify their leadership approach's appropriateness or adjust it accordingly, by reference to the ternary diagram. This avoids ontological clashes that may have fatal consequences if, for example, project managers with a being ontology try to manage teams that are used to having their freedom and a reality based on a becoming ontology. The team will feel overly controlled and directed. On the other hand, in the opposite case (an agile project manager leading a traditionally oriented team), the team will feel rudderless, and without orientation and/or direction. The model shown in Figure 1 should be used to develop project managers and team members in identifying suitable leadership approaches, contingent on project methodology.

As in any other study, there are strengths and weaknesses associated with this research. On the strength side are the wide variety of project types, which allows identifying the principal patterns of the SCS and its elements. Now that these are known, future research and more

detailed studies that leverage this initial work could follow by extending for instance to other types of projects (e.g. public, not-for-profit, or consulting) and by adding different countries to challenge the actual results presented in this paper. Specific research questions that should be addressed in the future include: development of measurement constructs for the SCS elements; the quantitative impact of different constellation of the SCS elements on project performance; which other team-psychological dimensions may play a role in the SCS; and differences in SCS element content by national and industry cultures. Strengths of the study are the clarity of the patterns and their partial support through existing theories, such as the ontological differences and the link between leadership styles and project types (Dulewicz and Higgs, 2005). Weaknesses are in the small sample size and the qualitative nature of the inquiry, which does not allow for generalizing the results to a larger population. However, through the empirical validation of the SCS model developed by Authors (2015) the findings contribute to generalization towards a theory in the sense of Yin (2009). Finally, with this research, we hope that researchers and practitioners would be more sensitive to the importance of balancing leadership to contribute to a better working environment, a culture of empowerment, self-esteem and self-management in managing projects in our society.

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Tables and Figures

Table 1: Leadership in Canadian project (CASE 1, PROJECT 1 / traditional method)

LS approach	*Role*	*Quote nb.*	*Quotation*
Balanced leadership	Senior manager	1	*"Based on their experience and knowledge, people were fairly autonomous in making decisions. They knew that they must comply with the project management practices of the company. There are decisions that cannot be taken by them. Thus, they know to whom to refer for approvals".*
Vertical leadership	Senior manager	2	*"Well, project managers and other resources are under my direction. Team members are under the project manager's direction. So it's the project manager who is responsible on site".*
		3	*"we are in the logic of who does what, most important decision-making is in the hands of the hierarchy".*
Horizontal leadership	Team member	4	*"project manager as well as team members use job and role description to share leadership".*
	Project manager	5	*"Each team member does its part according to its role and responsibilities" … "Each team member plays its' role".*

Table 2: Socio-cognitive space in Canadian project 1

SCS element	Role	Quote nb.	Quotation
Empower-ment	Senior manager	6	*"My management style is to interfere as little as possible, empower people as much as possible and I ask people to be autonomous ".*
	Project manager	7	*"My management style is to give them latitude or liberty. I ask my team members to be autonomous".*
	On-site engineer	8	*"Well, generally, I would say that each of us through its responsibilities and its scope of action is autonomous. Being autonomous, it does not mean you can do what you want, but it is being autonomous within guidelines."*
Self-management	Project manager	9	*"We trust our team members based on their respective expertise and roles and responsibilities".*
	Team member	10	*"I am paid to make these types of decisions"*
	Senior manager	11	*"As part of their work, there are methods to follow. So it's a bit in that sense that I say that the person is autonomous, he is capable of being responsible, and he is able to deliver the expected deliverables and to provide guidance and recommendations to a contractor. I try to make sure that everyone is able to be responsible in his work. I guess it's called horizontal leadership".*
	On-site engineer	12	*"If we look at project 1, well, I think each of us had his background, his past which perhaps gives confidence to our leader that everyone is capable to be autonomous".*
	Project manager	13	*"Mr. XX did not agree with what a contractor was doing. I [project manager] had different views on how to deal with the contractor and decided to do it differently".*
Shared mental models.	Project manager and team members	14	Decisions that are related to engineering issues are in the hands of the on-site engineer, who should report to the project manager and collaborate with the engineers at the headquarters

Table 3: Leadership in Dutch projects: CASE 2: PROJECTS 2.1, 2.2 and PROJECT 3

LS approach	Role	Quote nb.	Quotation
Balanced leadership	Project manager project 2.1)	15	"I think there is always some sort of decision making in the team itself, otherwise the project manager gets very busy. So if the team is longer working together, they are well aware of the subject. Let's say especially the task-oriented steering is hardly needed then from a project manager. I think there always needs to be a balance between both forms of steering. I have never seen a team where you say there is only horizontal steering and there is no leadership needed anymore. But if these two things are out of balance it can get very wrong".
	Group leader	16	"The decisions of the project manager are really about how we work. So how do we deal with, for example, design versus implementation? With what stakeholders do we work and how do we connect it to each other … The team composition, the way it works. So within the sprint or within the scrum team they can make their own decisions on how they work, but then they come to work, when they do new stand-ups and etcetera. But how they work with the external stakeholders like a design agency that is I think the responsibility of the project manager".
Vertical leadership	Project manager project 2.2)	17	"I would say that in the beginning of a project I am definitely somebody who wants control…I really want control and a good planning and that kind of thing. But I think that as your team grows and knows the material and have found each other…and you see that's OK, then it is a case of keeping an eye on it, but not interfering too much".
	Team member project 2.3)	18	"Top-down decision like: 'you are going to work on that right now or we should go that way', I only see that when the team hesitates or asks for it. … Decisions on team members to let go and business decisions".
Horizontal leadership.	Project manager project 2.2)	19	"You also have to know who is responsible for the decision in the end. I have a project architect who decides on the architecture of the solution, he will have a say and there are people outside who also have a say on security or whatever. It has to be clear that an individual can't take a decision on everything without checking".
	Project manager project 2.2)	20	"We have now a very good test team which is made up of developers, testers, our functional application management people, the business. They meet twice a week. I don't go to that meeting unless I am called in… I don't interfere where I'm not required".
	Team member project	21	"In scrum-teams you don't have separate roles of people; you have team members. Team members can of course have a specialism like I do in information and business

| 2.3) | | *analysis and requirements management kind of things, but there is no real difference other than that. That also means I sometimes participate in technical discussions. For instance, this sprint, we had some work upfront done, so for this sprint there is little information/business analysis work to be done, so I just pick up a programming task because I can do that as well. Sometimes I help the product owner in shaping her backlog and help her decide what priorities she can use. When she is not there, last week I replaced her role or tried to at least".* |

Table 4: Socio-cognitive space in Dutch projects

SCS element	Role	Quote nb.	Quotation
Empower-ment	Project manager project 2.1)	22	*"I try to pick always one who has certain capabilities in that area, is communication wise a bit more advanced. So it helps to do it in the beginning together and you give every time a little bit more of your role to such a person, so he is also accepted by his team members".*
	Group manager	23	*"Vertical leadership is really about creating teams that are able to empower themselves. I always learned as a manager you cannot empower someone; someone need to empower himself. And I also learned that a real leader is starting to lead when he's gone, so you try to really make the team responsible and grow and for that the team needs leadership to help them get to a next level every time".*
Fostering self-manage-ment	Project manager project 2.1)	24	*"We have a technical product analyst who is much more experienced and is longer in the organization, has much more knowledge. You can see if he joins the team that people know that, people understand where he is coming from, that he doesn't make statements that he is not certain of. We know that if he says: "I don't know, I look into it." he doesn't know, he looks into it. He doesn't make statements over things that he doesn't have the answer to. That is also important that you are allowed to not know things that you have to check back".*
	Team member project 2.2)	25	*"When people are done, it [the code] is going into a review stage where people push the code to a system and we can review it together and then you see, this guy is really good at writing back-end code so you see that is something you will have to learn along the way in the sprints".*
Shared mental models.	Project manager project 2.2)	26	*"We have a planning for; we are talking about engines, so we have a planning which engines are tested together or whatever. They [the team] decided how they were going to split up that testing and who was going to do it and who is responsible for certain parts".*
	Team member project 2.3)	27	*"Everything we're doing has a name on it. So we can see what is where, so we know who is working on what, what we had when we started this project, one or two of those kickoffs indeed, and along the way people leave and enter the project for various reasons, but we do make sure that we get to know people how good they are, for instance by lunching together or doing a lunch walk".*

Table 5:Leadership in Australian project: CASE 3: PROJECT 4

LS approach	Role	Quote nb.	Quotation
Balanced leadersip	Senior leadr	28	"We have put project managers for doing the actual major programs at work. The slight variation is our team leaders still have a portfolio of work with what to deliver as well".
		29	"Generally, [he[lets the project manager and his/her team to manage the projects but gets involved if any problem is escalated".
		30	"we seek the teams to make their own decisions and control their own destinies about what they do and it's only been exceptions as they bubble up this program leadership team that we actually get involved".
		31	"There was a general environment where collaboration was encouraged not only within project or program teams but also across projects
		32	"The senior leadership also expected PM's to be more than just transaction managers…. you need to be able to then be comfortable with the ambiguity as ultimately you don't know how the outcome will be because it's so complex".
		33	"We normally start off with the pre-discovery which is generally a high-level concept. We get a bunch of people and the project manager normally organizes that. Get a few key decision makers in around the main requirements that we are looking for.
Vertical leadership		34	"As a vertical leader you come in with a position of trust and believe that all the team leaders have sufficient skills and knowledge and the vertical leader has to rely on their skills to get the job done. The vertical leader believed in empowering the team to take up leadership …The team is empowered, to make decisions day-to-day, as a project manager I'm there as a point of reference if they need any support at all or if there's particular risk or issues that we need to address".
		35	"As a project manager, I see my role as being a ... supporting the team ... shielding the team from things that are happening about".
		36	"As far as leadership goes around delivery, we'd be looking at the iteration manager and the project manager to take blockages out of the way and get us resourcing if we need it".
		37	"We have been working on a particular feature and because of resource constraints I had to say," Sorry we are going to stop working on this feature"
Horizontal	Project	38	"Certainly, technical decisions are made within those teams.

leadership	Manager		*... You get the occasional armchair architect who will suggest a different way of doing things and you have to consider that. If they are senior enough, you have to listen to what they have to say".*
		39	*"The influence that the leadership team has is on where there are options, which option we choose, so there's a lot of comparison of options, presenting pros and cons of each and explaining that to the leadership level and a decision made.*
		40	*"Everything around day to day development with requirements we would always do within the team. It's only when a business requirement comes in that's out of scope and it's large".*

Table 6: Socio-cognitive space in Australian project

SCS element	Role	Quote nb.	Quotation
Empower-men	Team leader	41	*"We run an agile shop, so we promote everyone providing views, we prefer, in this company, we want people that are outspoken, and not silent. If silent people can bring out their thoughts, we can clear it out".*
		42	*"The teams can decide. A couple of developers might get together in a little huddle and agree on something and that is good enough".*
	Horizontal leader	43	*"We empower people to make decisions, we don't blame them if they get it wrong, it just makes a good place to work"*
Fostering self-management	A horizontal leader	44	*"As soon as you start working here we get agile training which anyone can attend. You pretty much have a big support network of everyone who's been doing this for years now".*
		45	*"When I joined, and I wasn't used to the bank, I'd come from insurance. The product is very complicated, so I try and explain the concepts just to give people a fighting chance of getting through their first month without their head exploding".*
		46	*"I think we've got other things, buddy system is one of them. Team leaders we have 1 on 1's with them once a fortnight. to give feedback on performance and on development plans*
	Another horizontal leader	47	*"The environment also allows them to make quick decisions when it is urgent and which can be redressed if it is wrong. This creates a "technical debt". The organization protects technical decision makers from the team "if you make a mistake, as long you own up to it, it's not your fault if you tried something that didn't work".*
Shared mental models.	A horizontal leader	48	*"In some teams they have a list of people who are experts. Generally, people in the company know who to go to for advice. New team members can seek advice on who to go to".*
	A team member	49	*"The BA {Business Analyst} chapters and guilds were supposed to make that a bit easier to deal with. As we were all previously on the same team we sort of knew who we needed to talk to as well. It's probably more pertinent now that we get the BA chapter back up*

Table 7: Leadership approaches and their SCS in different types of projects

Project type	Construction - Traditional *(Project 1)*	IT - Waterfall *(Projects 2.1 and 2.2)*	IT - Agile-Scrum *(Project 3)*	IT-Agile *(Project 4)*
Leadership				
Balanced Leadership	Low	High	Medium	High
Vertical Leadership	High	Medium	Low	Medium
Horizontal Leadership	Low	Medium	High	High
SCS				
Empowerment	Indirect for individuals	Direct for individuals	Direct for teams	Direct for teams
Self-management	Roles assigned by vertical leader	Past performance, reputation	Performance of team and individuals therein	Boosted through training, buddying, mentoring
Shared mental models	Known experts and project plan	Based on project plan ("being" ontology)	Based on project as it unfolds ("becoming" ontology)	Experts are easily identified through records, communities of practice and by word-of-mouth.

Figure 1: The relationship of leadership approaches to the SCS constructs