

# Exploring the performance of tacit knowledge: How to make ordinary people deliver extraordinary results in teams

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## ABSTRACT

Our research question is how do we transform individual and collective tacit knowledge into collective, explicit and actionable knowledge in teams?

As our methodological approach, we conducted a longitudinal survey study from 2012 to 2014 to of two teams of staff employed with a Norwegian furniture manufacturer. Each team included designers, production engineers, and salespeople. The survey included the teams and the upper corporate team. The survey monitored the design, production and market processes involved in launching furniture to the marketplace (30 months).

The teams decided to rotate their professional roles as designers, production engineers, and salespeople. This rotating role mechanism and socialization process encouraged the sharing of knowledge. The team members transformed their tacit knowledge into collective explicit knowledge, allowing it to deliver innovative results within a time limit. As a theoretical implication, we have found a workable means of transforming tacit, productive, individual and collective knowing into explicit actionable knowledge. Productive team knowledge was converted into tacit managerial knowledge in upper management personnel, enabling the group to translate knowledge into explicit business actions. We propose, as a general theory, that by rotating professional roles within a team individual tacit knowledge can be transformed into collective explicit knowledge. The productive team tacit knowledge that was transferred was identified as expert, nodding, familiarity and holistic knowledge.

As a practical implication, we show that rotating professional roles within a team works when a team is afforded enough time to develop a socialization process. When professionals are given direction, trust, responsibility and time to develop results, they break out of their comfort zones and deliver extraordinary results together. As a practical implication, we show that this process can be planned, managed and controlled. Role rotation facilitates both the creation of high-performance teams and the transformation of tacit professional knowledge into explicit knowledge. The transformation of tacit knowledge into explicit knowledge helps increase efficiency and effectiveness in knowledge-intensive corporations. Therefore, practically, is it possible to create a corporate flywheel from tacit knowledge? The conversion of productive tacit knowledge into tacit managerial knowledge converted into specific business actions can create an explicit corporate flywheel while maintaining tacit knowledge as a competitive advantage.

## 1. Introduction

We examine how tacit knowledge converts into explicit knowledge in teams and how this can be managed and controlled by upper management. We first ask what kind of professional knowledge is transferred and managed? We imagine that professional knowledge is divided into four types:

- 1 Expert knowledge derived from education and practical experience accumulated through one's profession. The expert applies his knowledge, skills, and attitudes to be regarded as a professional.

Designers, production engineers, and marketing specialists are, in this case, experts in their fields.

- 2 Working knowledge wielded by the professional with a working familiarity with a company or branch. All involved professionals have a working familiarity with other fields.
- 3 Recognizing or nodding knowledge wielded by the professional who is familiar with the current situation, as in this case of Norway's largest furniture company.
- 4 A combination of expert, working and nodding knowing transformed into holistic professional knowledge. A team leader possesses holistic professional knowledge.

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Expert and holistic knowledge mainly reflect tacit forms of knowledge. The processing of knowledge is tacit, while generated results are explicit. Working knowledge (e.g., knowledge of procedures) and nodding knowledge (e.g., the recognition of patterns) can be stored in information systems and reused. We cannot store tacit knowledge or reuse it, while explicit knowledge can be stored and reused. For any business, access to tacit knowledge is a competitive advantage, while explicit knowledge is available to all companies. The transformation of tacit knowledge into collective explicit knowledge in a corporation generates more possibilities and opportunities for synergy and innovation. We have been examining ways to transfer and share tacit knowledge since Polanyi (1958, 1966) first coined the concept. Polanyi defined tacit knowledge as difficult for individuals to articulate because it is practical knowledge developed by individuals as they attempt to master various tasks over time. Nonaka and Takeuchi (1995) presented tacit knowledge as an essential facet of "The knowledge creating company". In their view, an organization creates knowledge through interactions and through conversion between tacit and explicit dimensions. Barney (1991) and Spender (1996) identified tacit knowledge as an essential strategic resource for a firm. Baumard (1999) and Choo (1998) studied the management and importance of tacit knowledge in organizations and teams. Organizations face considerable challenges in extracting benefits from knowledge not converted into a more explicit form. It is considered necessary to observe tacit knowledge under working conditions, to find a knowledge worker as a mentor, or to develop a culture that encourages the development of tacit knowledge. Two later studies conclude that research conducted on the transformation of tacit knowledge has come to a standstill without offering practical implications on the transformation of tacit knowledge (Aarseth, 2014; Pettersen, 2015). In particular, little progress has been made in developing an understanding of the nature and extent of the contributions of tacit knowledge in terms of improving the performance of a business or production process (Shamsie & Mannor, 2013). Wallace, Van Fleet, and Downs (2011) concluded that this lack of progress is rooted in a lack of "established social science research methods ... in refereed journals in knowledge management" (p. 19), as articles do "... not meet typical criteria for formal research methods" (p.19) and do not address difficult research questions regarding the performance of tacit knowledge. Zahedia, Shahinb, and Babar (2016) concluded that "organizational contextual information is missing from a large number of studies" (2015, p. 995), making it impossible to understand contexts of tacit knowledge and knowledge sharing. Duguid (2005) concluded that studies based on readily available explicit knowledge to the exclusion of tacit knowledge take us back, not forward.

Wang, Huang, Davison, and Yang (2018) revealed that knowledge transfer positively relates to team performance and that knowledge sharing among individuals is necessary for the effective and efficient completion of team tasks. We do not, however, have longitudinal studies on the rotation of professional work roles in teams as a means of transforming tacit knowledge (Olaisen & Revang, 2017a,b). There is, in general, a lack of research on the transformation of tacit professional knowledge in teams. We decided for these reasons to examine the following research question: How do we transform individual and collective tacit knowledge into collective, explicit, actionable knowledge in teams? We were afforded the empirical opportunity to follow the processes of two teams for the whole study period until the developed product was launched (30 months). The point of production launch represents the linking of tacit knowledge to business performance and industrial production.

## 2. Methodology and study design

This study is explorative and conceptual and uses concepts of knowledge management together with in-depth interviews with two Norwegian teams creating new furniture designs. The design process

represents the meeting of the art of design, craftsmanship and the market. Each team included seven members. Two of the members were professional external designers, two were production engineers, two were salespeople, and one was part of the upper management team.

The design process lasted for two years. We conducted a longitudinal survey study from 2012 to 2014 of the whole design, production and market process. We conducted a total of 21 individual interviews with each team 6, 12 and 18 months after the start of the process. We held two team meetings before conducting the survey and two team meetings after the completion of the survey for reflection and discussion. We sent interview transcripts and summaries of the sessions to each team member to solicit comments, additions, and criticisms. We held a one day-long meeting with each team after the completion of the process. The teams were employed with the Norwegian furniture producer Ekornes. The design process involved collaboration between two Ekornes production sites. We followed the process through to the introduction of the designed furniture into the marketplace. The total survey process lasted 30 months. We interviewed the upper corporate management group (9 individuals) of Ekornes twice (18 interviews) to solicit their views on critical success factors. Each member of the upper management team was given a summary of the interviews and was asked to correct and include additional information through emails and phone calls. After 30 months, we held a meeting with the upper management team. We conducted a total of 60 in-depth interviews and held seven meetings.

We referred to Baugh (1990); Yin (2009), and Richter (1998), together with Alvesson and Kärreman (2007), to develop the methodological basis for the study. We designed the study as a conceptual study focused on developing and applying concepts of the modes of knowing. Our descriptions, analyses, and theoretical approach are thus integrated.

## 3. The case

Ekornes is a leading Norwegian furniture producer with annual sales of 420 million Euros and 2300 employees. Its main production site has always been located in the small town of Sykkylven (8200 inhabitants) located on the north-western coast of Norway. Ekornes values sustainable production together with the development of its workers' knowledge, skills, and professional attitudes. Ekornes has long cooperated with all senior high schools in its area in educating and recruiting new staff. The company's turnover rate is very low. Ekornes recruits all of its leaders through the Ekornes pipeline system. Ekornes views competence and design as central to market survival. The company has emphasized teamwork through self-governed working groups for more than 30 years. Ekornes shares its profits with its employees and shareholders. No bonuses are given throughout the year because its personnel is expected to work from intrinsic motivation with a permanent salary and yearly bonus dependent on company profits. Ekornes exports 91% of its products to the EU and USA. Ekornes is known for producing well-designed furniture and high-quality products. Its most widely known product is the "Stressless" chair, which has been produced in various styles since 1984 (Ekornes, 2018).

## 4. Modes of knowing

### 4.1. Rotation of team roles

Rather than focusing on types of knowledge, we discuss ways of knowing, as it is our perception that knowing involves an on-going process. Types of knowledge only provide us with a snapshot of this process and thus provide us with a static idea of knowledge. Hence, our modes of knowing model applies a fluid scale of non-representable to representable knowing in which boundaries between the levels are unclear (Topp, 1999; Nag & Gioia, 2012). We have selected three knowing modes. One is non-representable knowing, which refers to the



# Permanently Rotate the Winning Team

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## Abstract

International business is highly dynamic, diverse, and innovative. In such an environment, the institution of a single CEO exhibits several major drawbacks: The interests and strategies of the CEO and other top managers are often not well aligned, allocating so much power to one person is risky, and the change of a CEO entails large costs due to discontinuities in strategy. The standard alternative to a single CEO is a top management team working collectively. Its decisions tend to be poorly focused and insufficiently implemented as its members often cater more to the interests of their department or service unit than to the success of the whole firm. Based on a comparative economic analysis of the top-managers' incentives, we argue that a novel governance institution of a rotating chief executive officer is better adapted to international business. Our proposal combines the two traditional systems by regularly rotating the CEO position among the members of a leadership team. The special interests of the various branch managers are checked as they are integrated into pursuing the overall goals of the firm. Rotation contributes to overcoming the specific interests and silo mentality of the various sections and departments in a firm. We discuss how the new institution can be designed, assess its most important advantages and the problems involved, and relate it to other rotating leadership systems in the modern economy, in history and in politics.

**Keywords** Corporate governance · Organization · Institutional economics · Political economics · Leadership

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## Introduction

In the increasingly dynamic and diverse international business environment, the concentration of power and responsibility on the CEO as a single leading person is progressively problematic. While one individual is often overburdened by the huge diversity of issues to be solved and tasks to be fulfilled, strong leadership is still required. Thus, returning to the formerly widely used more collective organization with a leading executive team is no solution. Given that both institutions have advantages and disadvantages, we propose a new combination of these two systems: *rotating chief executive officers* (R-CEOs). This is based on a small group of collective leaders, who rotate through the position of CEO, each for a short period. This institution overcomes several of the problems in the present system of a single CEO while retaining some of the advantages of a more equal and collaborative system.

This paper contributes to the literature by providing a comparative economic analysis of the R-CEO and the single CEO systems by focusing on the top-managers' incentives. It deciphers the many advantages of the R-CEO system, investigates why the system is despite of its potential not yet more widespread and discusses some important examples of rotating leadership in history and in politics, which illustrate that rotating leadership has been successful and sustainable in different environments and over long periods.

The remainder is organized as follows: the "[Evolving Problems with CEOs](#)" section discusses the problems arising with traditional CEOs in the currently evolving international business environment. The "[Related Literature](#)" section assesses some of the major proposals made in the academic economics and business literature and practice to deal with the problems of one single individual dominating a firm. The "[Rotating Chief Executive Officers](#)" section discusses how the institution of R-CEOs here proposed may be constructed. The "[Rotating CEOs: A Fruitful Development](#)" section argues how an R-CEOs system can mitigate or even solve the various shortcomings of the presently dominant arrangements of a CEO. The "[Related Rotating Leadership Systems](#)" section shows that rotation played a significant role in various leadership systems in the economy and the polity, including important historical cases. The "[Conclusions](#)" section presents an overview of our proposal and concludes.

## Evolving Problems with CEOs

### Current Situation

Establishing the position of a CEO is confronted with various problems, as innumerable media reports tellingly illustrate. Selecting one person to lead a firm is risky because his or her success in this role is difficult or even impossible to predict. Once

in power, a CEO may exert excessive influence and may abuse it to his or her personal advantage rather than to the benefit of the firm. This results in very large salary differences between the CEO and other managers and employees of the firm. Due to their prominent positions, CEOs tend to overestimate their capabilities and fall prey to overconfidence (e.g., Malmendier & Tate, 2005). This may lead to the firms taking excessive risk. Open discussions within the management are not welcomed. Ideas and suggestions by other managers are not sufficiently fostered or are even disregarded, resulting in a loss of team spirit both in the management and among lower-level employees. Usually, the CEO is not the best in every possible aspect of management. The firm tends to be shaped to suit his or her specific strengths while productive interaction between managers with other skills is neglected. However, evaluating the performance of a CEO is difficult as there is rarely an obvious counterfactual. Thus, evaluations are often affected by an outcome bias (see, e.g., Camerer et al., 1989): the absolute performance of the firm is given too much weight in the assessment of the CEO's performance.

Another unhealthy consequence of such a prominent position is that many CEOs are unwilling to invest time and effort in developing managers who are capable to succeed them. They cannot imagine that anybody else can do the job as well or even better, and they fear that identifying potential successors early could endanger their own position. Therefore, CEO succession planning is a critical process that many companies either neglect or mishandle. The succession is therefore often reactive and separated from the wider system of management and talent development (see, e.g., Bilgili et al., 2020). This approach bears significant risks: potentially good candidates may not be given sufficient time or opportunities to develop their abilities, unpolished talent can be overlooked, and companies may gain a bad reputation for not developing their management.

## **Evolving Variety**

So far, the widespread use of the CEO model implies that the disadvantages of having a CEO have been overcompensated by the respective advantages. But there are many arguments for the disadvantages to grow and the advantages to shrink.

The increasing dynamics and diversity of problems which are typical for international business in quickly growing world markets make it increasingly difficult for one person to take the most important decisions correctly. The more complex and the less clearly structured problems become, the more important is an open-minded search for opportunities, a balanced evaluation of all possible solutions, and a failure-correcting decision process.

With such developments, it is likely that the role of leadership is also changing. Thus, the old institutional structures of leadership must be suitably adapted. An open discourse within firms is becoming more important. However, an open discourse only evolves when power structures and dependencies can be overcome, thus undermining the CEO system, which relies on high centralization of power.

As it is unlikely that a specific person is the best CEO for all likely states of the world, it is to be expected that with increasingly dynamic markets and environments

CEOs will be changed more often to try to optimize the CEO's fit with the problems facing the firm. This is already clear from the fact that the time span of CEOs tenures is diminishing. Comparing the period 1992–2000 with 2000–2007, Kaplan and Minton (2012) find that a CEO's average tenure decreased from below 7 to less than 6 years, i.e., by about 14% over 8 years. While this is quite a large change, it seems to reflect a general and ongoing trend of decreasing CEO tenures. For outgoing CEOs, the mean tenure was 6.6 years in 2010 versus 8.1 in 2000. In particular, the length of planned tenures—in which the CEO departs on a date that has been prearranged with the board—has dropped by 30% over 11 years, from 10 to 7 years (Favaro et al., 2011). During the more recent 5-year period 2013–2017, the median of CEO tenure at US large-cap companies decreased by a full year—from 6.0 years to 5.0 years (Marcec et al., 2018).

Growing cultural diversity within firms strengthens centrifugal forces. To integrate the various parts of firms, it is becoming more important not only to monitor and incentivize decentralized units and their members but also to strengthen their intrinsic motivation to serve the common interest within the firm.

The next section considers whether, and to what extent, these issues and potential countermeasures have been discussed in the academic economics and business literature.

## Related Literature

In economics, Shleifer and Vishny (1997) provide a valuable survey of the general issues of corporate governance, but they only indirectly discuss the specific role of CEOs. The broad review by Bertrand (2009) argues that entrenched and cognitively biased CEOs may cause the activities of a firm to deviate systematically from the maximization of firm value. Literature on leadership in management science also suggests that a single CEO in a firm may be destructive, bad, or abusive (e.g., Aasland et al., 2010; Akbar et al., 2021; Bligh et al., 2011; Hasiija et al., 2017; Kellerman, 2004, 2012; Schyns & Schilling, 2013; Shi et al., 2020; Verstein, 2020). Overall, the CEO selection mechanism by boards might not be the best choice in contrast to principals choosing the CEO (Khurana, 2004). In various organizational structures, especially with lower organizational complexity, principals take this decision (Federo et al., 2021). R-CEOs have the potential to compensate for adverse effects in both approaches.

CEO positions in many firms have become so complex that they seem to have outgrown their traditional one-person boundaries. Modern CEOs must address multiple escalating and often conflicting economic and social expectations that vary both within and between stakeholders over time. Under the traditional dominant singular CEO system of top firm leadership, however, significant gaps have grown between firm performance and societal expectations (Hasiija et al., 2017; Tan, 2022). We suggest that one way to increase the chances that CEOs may make both more responsible decisions and fewer irresponsible ones is to share the CEO position. Such collaboration reduces the isolation of the singular CEO and thus offers better



commercial and social outcomes. However, frequent CEO changes have been found not to be conducive to firm performance (Akbar et al., 2021).

Reviews of the literature in management science (e.g., Bennett et al., 2003; Bolden, 2011; Denis et al., 2012; Gronn, 2002, 2008; Koccolowski, 2010; Pearce et al., 2008) show that shared leadership has been practiced in various forms for centuries (Sally, 2002), but indicate that research on the subject is still in its infancy. A large proportion of studies on shared leadership are in healthcare (Jackson, 2000; Konu & Viitanen, 2008; Merkens & Spencer, 1998; Spooner et al., 1997; Steinert et al., 2006) and education (Boardman, 2001; Hall, 2001; Meyers & Johnson, 2008; Prather et al., 1988; Rice, 2006; Wallace, 2001). There are a few studies outside these two domains, in new ventures (Ensley et al., 2006), road maintenance teams (Hiller et al., 2006), churches (Wood, 2005; Wood & Fields, 2007), equipment and engine manufacturing (Anderson et al., 2008), technology (Hsu & Sharma, 2008), local government (Berman, 1996), consulting teams (Carson et al., 2007), sales teams (Mehra et al., 2006; Perry et al., 1999), police departments (Steinheider & Wuestewald, 2008), and banks (Walker et al., 2008).

In this literature, the commonly cited benefit of shared leadership is the synergy and expertise derived from a shared leadership model. Leaders can concentrate on their individual strengths, while their weaknesses can be compensated for (Miles & Watkins, 2007), and organizations can benefit from diversity of thought in decision-making (Bligh et al., 2006). More leaders are better than one when a corporation faces highly complex issues that require a set of skills too broad to be possessed by any one individual (O'Toole et al., 2002: 68). If these leaders think independently and discuss the issues to be solved with different sets of people, they may profit from the wisdom of the crowd (e.g., Kremer et al., 2014). Moreover, shared leadership helps to overcome the silo mentality, a mindset which prevents the employees of some departments to share information with others in the same company.

Another advantage of shared leadership is reduced stress levels for key leaders (Pearce, 2007). Furthermore, shared leadership exploits the multitude of talent present in an organization and so creates competitive advantage (Lee-Davies et al., 2007). With shared leadership, creativity seems to flourish (Hooker & Csikszentmihalyi, 2003), and teamwork seems to improve (Carson et al., 2007; Mehra et al., 2006). Finally, shared leadership is particularly important in the case of new ventures (Ensley et al., 2006).

The literature on shared leadership also discusses the disadvantages of such a model. It is sometimes difficult for a group of leaders to reach consensus, so decisions can take longer (Miles & Watkins, 2007). Turf wars and individual career goals are other possible obstacles to efficient decision-making (Jackson, 2000). Commitment to team performance and team member accountability may become unclear in shared leadership (Katzenbach, 1998). Consequently, shared leadership benefits group performance only under certain conditions (Bligh et al., 2006; Seibert et al., 2003). The literature on shared leadership affirms that more research is needed to examine the spectrum of relevant issues (Conger & Pearce, 2003; Yukl, 2006).

There is a small literature dealing with co-CEOs, i.e., “two executives who, over time, perform the top job together in a coordinated fashion and are held jointly accountable for the company or unit’s results” (Alvarez & Svejnova, 2005: 115).

It is closely connected with the theory of dual leadership (Etzioni, 1965). Complex organizations can be successful when a team as a whole rather than a single individual leads a firm (Pearce & Conger, 2003a, 2003b). Shared leadership can foster greater commitment and information sharing among team members. Using multiple leaders' complementary knowledge and skills, teams can bolster creative decision-making (Cox et al., 2003). Several empirical studies have found that teams with shared leadership outperformed teams led by a single leader (e.g., Carson et al., 2007; Ensley et al., 2006; Hmieleski et al., 2012).

Co-CEOs are important in family businesses and in smaller firms, which tend to have a more limited corporate focus, less independent board structure, fewer advising directors, lower institutional ownership, and greater levels of merger activity (Arena et al., 2011). Their numbers are also growing rapidly in public firms (Hasijsa et al., 2017). The average tenure reported for co-CEOs in US public firms of 4.7 years (Arena et al., 2011) is similar to the 5.4 years average tenure of single CEOs (Quigley & Hambrick, 2015), indicating that the co-CEO system is quite stable. A study by Arena et al. (2011) finds that co-CEOs tend to complement each other in either educational background or executive responsibilities.

Job rotation has been extensively discussed in management studies (Arya & Mitendorf, 2004; Kampkötter et al., 2018). This practice is increasingly used, and the effect of this human resource innovation on performance has been documented (e.g., Ichniowski & Shaw, 1999; Ichniowski et al., 1996, 1997). It bolsters employees' learning, helps them to accumulate human capital, and fosters their motivation, because boredom is reduced. Another benefit of job rotation is that the superiors receive information about the quality of several job-employee matches rather than just one (Jovanovic, 1979; Ortega, 2001).

To the authors' knowledge, rotating CEOs have not been treated in the scientific literature. Davis and Eisenhardt's (2011) paper uses the term "rotating leadership" but does not explicitly deal with a rotation of a group of top managers through the CEO position and does not link to the literature on shared leadership. Rather, it deals with the effect on innovation of revolving decision control between two partner organizations. The results of their empirical analyses are nevertheless relevant to our topic. The extremes of domineering leadership or consensus leadership processes produce fewer innovative collaborations. In contrast, rotating leadership between the partners over time fosters innovative activities. While Davis and Eisenhardt's (2011) results apply to the relationship between two organizations, the insights may be relevant for rotating CEOs within the same firm.

## Rotating Chief Executive Officers

Today, the firms' boards try to counteract the problems pointed out with the position of single CEOs by making great efforts to choose future CEOs. Usually, they appoint special selection committees that devote considerable time to making good choices, and they search the advice of specialized outside firms. However, most companies perform no better after they dismiss their CEO than they did in the years leading up to the dismissal (Wiersema, 2002). The organizational



disruption created can leave a company in deep trouble. Boards often lack the strategic skills necessary to choose new and better CEOs.

Usually, it is attempted to make the contract with the CEO incentive compatible by offering incentives such as (deferred) stock options and bonuses for good outcomes. This measure certainly reduces the problems of the regular CEO system but in many cases seem to fail. We therefore suggest a more fundamental change, the institution of rotating CEOs. Rotation is a procedure in which the members of the top management team regularly become chief executive officer for a restricted period such as a year. The members of the management team occupy the chief position at pre-determined intervals but keep responsibility for the tasks they perform as members of the management. Thus, the concept of R-CEOs combines two ideas: having one person in charge and responsible for the firm and having a collective, well-motivated interacting team in which everyone has a say. This combination seeks to combine the advantages of both systems.

There are various rules according to which the rotation of the top management team can take place.

**Speed of rotation** Rotation may automatically follow according to given characteristics, most importantly seniority within the top management team. But there may also be a fixed sequence according to, for instance, departments of the firm, nationality, or gender.

**The top management team** The group from which the R-CEO is chosen should have some degree of stability to ensure that the managers taking this position have sufficient firm-specific human capital. Its size should be restricted to three to six members, so that they all can expect to occupy the chief position within a reasonable period of time. This prospect supports identification with the firm as well as fair behavior.

**Length of tenure** If R-CEOs are changed quickly, they cannot exert much influence on the management of the firm; if R-CEOs stay in this position for too long, the other members of the top management team see little prospect of filling the job in the future. In many cases, a yearly change may be appropriate.

**The competencies of the R-CEOs** As in a more collective organization, they may simply organize and preside over the meeting of the top management team and formally represent the firm without holding any other formal decision power. They may be *primus inter pares*. At the other extreme, R-CEOs may have the full competencies of a single CEO – but only for a limited period. R-CEOs may be instituted for the firm as a whole or for subunits, say for national subsidiaries.

**Compensation of the R-CEOs** It must be determined relative to that of the members of the top management team among whom the future R-CEOs are to be chosen. The specific solution must again depend on the competencies given to R-CEOs and the situation of the firm.

## Rotating CEOs: A Fruitful Development

### Advantages

Rotation counteracts the problems pointed out with the position of a single CEO via several mechanisms: Every member of the top management team has the prospect of leading the firm. His or her special skills can come to the fore when in the CEO position. At the same time, the regular rotation favors close interaction and fairness within the team, as any R-CEO knows that he or she must continue to work with his colleagues once leaving the chief position and has a good chance to come back into the R-CEO position after some few years.

Therefore, we hypothesize that the practice of rotating CEOs would offer a number of benefits to the firms relying on the system.<sup>1</sup>

**Smaller Selection Risk** The tasks of a chief executive officer are distributed over several individuals. There is a larger variance of abilities and strengths than with one single CEO. An R-CEO is less subject to overconfidence because he or she cannot establish a position in which all other managers are dependent on him or her and, therefore, tend to refrain from challenging the CEO's positions. Moreover, there is a smaller risk of burnout than with a single CEO who suffers from work-overload during many years but clings to his or her position.

**More Equality and Team Spirit** R-CEOs are part of a team to which they return when their tenure has elapsed, and the members of the top management group are not in a fixed position subordinate to a single CEO. The rotation supports open discourse among the top management team, broadens views, opens new alternatives, and furthers agility. R-CEOs and the members of the management team are well aware that they need the support of their colleagues after changing roles, which incentivizes them to cooperate. Regular rotation creates a feeling of bonding with the firm's goals. The specific interests of departments and their managers lose prominence. Greater equality among the top management team results in smaller income differences than in a system with one dominant CEO.

**More Diversity** The areas in which CEOs have decision rights are distributed among a larger group with more diverse specialized knowledge, skills, personal characteristics and responsibilities within a firm. The greater diversity provides a good opportunity to integrate various perspectives, sometimes even contrasting ones. This enables the top management team to go beyond the particular interests of the various departments. They are better aware of overall aspects of the firm, which otherwise are mainly handled by a single CEO.

<sup>1</sup> Some of these aspects are also discussed in a research note in German (Authors, 2021).

**Higher Performance** A regular rotation of chief executive officers allows comparing their effort and many important aspects of their performance. R-CEOs who are not up to the task are likely to leave the firm because their shortcomings have been revealed. This contrasts with single CEOs who can hide their failures in many ways.

**Reduced Exposure to Outside Pressures** As the CEOs rotate regularly, a particular R-CEO is more immune to threats from competing firms, the government administration, suppliers, and stakeholders than is one single CEO, who may be more strongly influenced from outside the firm.

**Longer Time Horizon** Traditional CEOs often lose assertiveness and a longer-term perspective when the end of their term becomes foreseeable. In addition, the change of CEO tends to produce fundamental breaks in strategy. R-CEO teams, on the other hand, have an unlimited time horizon. While the composition of the team is constantly evolving, the majority of members still have many years of tenure ahead of them. Thus, the system simultaneously brings continuous change and a longer-term strategy. During their tenure, single CEOs are able to establish a network of contacts important to the firm. Such networks need time to be established. However, the recent shortening of the time that single CEOs are in office reduces their capacity to establish firm-specific networks. In contrast, a team of R-CEOs can effectively establish such contacts as it consists of several individuals who often remain longer in office than a single CEO normally does.

**Mitigated Succession Problem** New members of the top management team can be more easily integrated into the firm. They are first part of the general management team and only later may serve as R-CEOs. The members of the R-CEO team as well as other top managers who aspire to become R-CEOs are less threatened by high-performing newcomers and have more effective incentive to develop new potential members for the R-CEO team than a single CEO. As they are closely integrated and bonded, they have an interest in acquiring capable colleagues.

**Stronger Performance Incentives for Lower Management Levels** To second- and third-level managers, the R-CEO system provides positive performance incentives. With the R-CEO system promotions to the top level are more frequent than with a single CEO. Moreover, there are usually several potential candidates for the position of an R-CEO. In such multi-person contests it pays less to obstruct other candidates and damage their reputation than in a two or few candidates race which are typical for the single CEOs. Instead, everyone must try to stand out themselves by performing as well as possible.

**Better Selection for Supervisory Bodies** Former CEOs often sit on supervisory committees. This means that company-specific knowledge can be put to further use. However, there is a risk that former CEOs may overly preserve their old corporate strategy and try to cover up old mistakes. With an R-CEO team, the number of people with extensive company knowledge and thus the set of candidates for the

supervisory boards increase, and the pressure on them to present the past as rosy as possible decreases.

### Why Is It Not Common?

In view of the advantages of the R-CEO system outlined, the question arises as to why the system has not yet gained acceptance in management. We see two explanations: First, the R-CEO system is not advantageous over traditional CEOs under all conditions, but mainly under conditions that have developed recently and are likely to further develop in the future. Second, firms that switch to the R-CEO system early on risk a certain brain drain. Particularly successful R-CEOs might migrate to other firms aiming at traditional CEO positions. However, this risk quickly diminishes when other firms also switch to the R-CEO system. Moreover, companies could even use manager churn to their advantage by implementing the solution common in team sports: R-CEO team members could be contractually committed to pay compensation if they move companies. Such contracts would give companies incentives to develop managers more strongly and in a more targeted manner. At the macro-economic level, this would make good top managers less scarce and reduce income inequality (Eichenberger, 2013).

### Related Rotating Leadership Systems

In contrast to modern management, rotation systems have been used for several leading positions. In the following, we therefore discuss the evidence for the success of systems with rotating leadership in business and politics.

#### Rotating CEOs

Huawei Technologies Co. operated a rotating CEO system, under which the CEO served as the highest-ranking executive responsible for the company's operation management and crisis management. They were also responsible for convening and presiding over the meetings of senior executives. The rotating CEOs were served by three vice-chairmen with tenures lasting 6 months. Huawei ended its chief executive rotation system, with Ren Zhengfei remaining CEO following the most recent board election. The Shenzhen-based firm has switched the rotation element from the position of CEO to the position of chairman. Under the new rotating chairman system, three currently rotating CEOs will continue to serve as rotating chairmen. The rotating chairman will be the company's highest-ranking leader, and he or she now leads the board of directors and managing board of directors for 6-month tenures (Dong et al., 2023).

Other less well-known examples of rotating CEO systems have been implemented at the Zino Innovation Hub (Hero Hub) in Auckland, New Zealand, at CSPC Pharmaceutical (Reuters, 2017), at Jingdong mall (iMedia, 2024), at the

Swiss Health and Happiness Group (Nutraingredients, 2023), and at an insurance stock startup in Paris (Lovy's, 2022). The latter introduced the rotation system in order to better promote innovation and development. The company expects to improve the organization's synergy efficiency, stimulate the innovative vitality of the team, and provide a broad stage for leading talents. Last but not least, rotating CEOs are often found in consultancy firms. A prominent example is McKinsey, where the managing director is elected for three years by the senior partners. However, as he or she can be re-elected twice, the rotation principle is compromised in this case.

## In History

**Consuls of the Roman Republic (509 BC to 27 BC)** The Republican constitution existed, and was successful, over almost five hundred years. Every year, two consuls with civil and military responsibilities were elected. This was the peak of a political career (*cursus honorum*). The two consuls served together, each having a veto power over the other's decisions. The presidency of the Senate rotated between the consuls, with each holding the post for 1 month at a time. During wars, each consul commanded an army, normally two legions. In rare cases, they marched together, in which case each one commanded the unified army for 1 day, and then, the other consul took over. The Roman Republican consuls are an extreme example of power rotating over 1 month, or even 1 day (for an extensive discussion see Sally, 2002).

**Podestà in Medieval Italian Cities** A fascinating example of rotating political leadership is the podestà system (Eichenberger & Funk, 2009; Greif, 1995). In the independent Italian city states of the twelfth and thirteenth century, the head of the government (i.e., podestà) was often not a citizen of the state but a foreigner who was invited to rule the city state for a short period, most often a year or 6 months. The podestà system developed because the city states often suffered from factionalism and civil wars. The podestà system was established in a large number of city states, leading to an open market for podestà, who rotated between Italian city states. However, the system proved to be unstable. The unprecedented economic expansion brought about a change of the power distribution in the city states, which again favored government by a member of one of the local factions instead of a neutral foreigner.

**Switzerland** In historical Switzerland, power sharing through rotation played a key role. While Switzerland was composed of various autonomous cantons, the federal authority was the *Tagsatzung*. This body was a meeting of the representatives of the cantons. The presidency of the *Tagsatzung* was taken by rotation by the *Vororte*, the most powerful cantons. However, the cantons decided using majority and unanimity rules. The most important joint project of the cantons was the ruling of the dependent regions, the *Gemeine Herrschaften*. Again, the presidency of these joint territories rotated among the cantons.

## In Modern Politics

**European Union** Presidency of the Council of the European Union, also called Presidency of the European Union, rotates. The President determines the agenda and chairs the meetings of the Council, the upper house of the EU legislature. This position rotates among the member states of the EU every 6 months.

**Swiss Federal and Cantonal Governments** In Switzerland, the governments at the federal, cantonal, and municipal levels are consisting of teams of five to nine councilors which are either elected by the population (cantonal and municipal levels) or the parliament (federal level). Each councilor heads a government department. The decisions are made jointly according to the majority principle. At the federal level as well as in most cantons and many municipalities, there is no elected president of the government, but this position is rotating among the members of government on a yearly basis. The President chairs the Council meetings and carries out certain representative tasks. He or she keeps his or her department and is *primus inter pares*, having no additional power above and beyond the other councilors. Surveys among members of municipal governments show that this system results in a high satisfaction of government members with the decision processes within government and local democracy in general (Eichenberger et al., 2019).

**Presidency of the United Nations General Assembly** The Presidency rotates every year between five geographic groups: Africa, Asia–Pacific, Latin America and Caribbean Group, Eastern Europe, and Western Europe and other nations. The President chairs the yearly General Assembly of the UN.

## Conclusions

This paper argues based on a comparative economic analysis of the top-managers' incentives that a group of rotating chief executive officers, the R-CEOs, are better adapted than regular single CEOs to the increasingly dynamic business environment. The crucial role of the CEO in securing the overall success of a firm is taken seriously. However, the members of the top management are often insufficiently integrated and their ideas little supported. Conversely, having a top management team working collectively tends to fail because the decisions taken tend to be poorly focused and insufficiently implemented in the organization. Our proposal combines the two systems by regularly rotating the CEO position. The special interests of the various branch managers are checked as they are integrated into pursuing the overall goals of the firm. Rotation contributes to overcoming the specific interests and silo mentality of the various sections and departments in a firm.

Although the institution of executive-CEOs promises to be economically and socially productive and rotation of leading decision makers is a system often used in politics, it has so far only rarely been implemented as a governance institution in management. However, its efficacy will increase with the further development of the



management environment, most notably with increasing globalization and diversity, and with its own propagation. The more firms implement the system, the less they suffer from their R-CEOs being headhunted by firms who search for a single CEO. Therefore, we expect R-CEOs to be a model that spreads in the next decennia and recommend to all boards who doubt that the institution of a single CEO is ideal for their firms to thoroughly ponder to substitute their single CEO with a group of rotating CEOs.

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## Declarations

**Competing Interests** The authors declare no competing interests.

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notion that it is impossible to make tacit knowledge explicit. Another mode is non-representable knowing, which means that through specific processes or means it is possible to externalize facets of knowledge. Finally, representable knowing is easily externalized and represented through formal and informal communication (Rosendahl, Olaisen, & Revang, 2014). We must relate a typology of knowledge to each mode to understand which form of knowledge each knowing modus represents.

- 1 What we know is defined as representable knowledge.
- 2 What we do not know is defined by what we know. We identify this as non-represented knowledge.
- 3 What we do not know that we know is defined as non-representable knowledge, as we must render such knowledge non-represented before it can be representable and known.

The two teams adopted a regular professional mode of representable knowing. Both teams understood, after four months, that they could not go on mainly using representable knowing as a basis for their work. They decided to switch roles and to allow designers to become production engineers, to allow marketing personnel to act as designers, and to allow production engineers to act as marketing personnel. They worked like this for four months and found that they were sharing knowledge much more effectively. They decided to rotate functions for another four months, with team leaders rotated every four months for each task. Leadership roles were changed every two months to afford each professional leadership experience. The group had returned to its initial arrangement after 18 months. Split roles (e.g., designing/production, designer/marketing, marketing/production) were then adopted for three months, with the professional leader acting as the group leader for the last three months before the team decided to conclude its work based on initial team roles. As a result, each team experienced an exceptional means of sharing knowledge and developed an excellent understanding of the process from design to production for the market. The two teams underwent a process that represented all modes of knowing. The two teams shared their experiences every second month, and no significant differences were observed between the two teams. Ties within the teams were strong, which eased the transformation of expert, working familiarity and nodding knowledge. The importance of close ties corresponds with the findings of Zhong, Huang, Davison, Yang, and Chen (2012), as strong ties eased the sharing of expert knowledge and team coordination.

#### 4.2. Non-representable knowing

Non-representable knowing is a mode that individuals and groups develop over time and that cannot be made explicit. Non-representable knowing itself thus takes place as individuals or groups gain experience, but it remains non-representable. Examples of non-representable knowing on a personal level include intuitive knowledge and emotions. While it may not be easy to express why we make decisions, from "gut feelings" we determine the right thing to do.

Collective non-representable knowing is represented in culture through, for instance, unwritten rules. This can have, for example, synergistic effects, i.e., positive effects of practices and relationships that develop when individuals work together over time. We generate such results through the links and relationships that connect members of a professional society (Boisot, 1998). While it can be difficult to identify what culture is, it still has a significant impact on the behaviours and development of a society and its members. Bonora and Revang (1993) supported this conclusion in arguing that knowledge is always deeply embedded in an organization's culture. They stated that culture represents "a system of shared values and beliefs that produce norms of behaviour and establish an organizational way of life" (p. 208). Aarseth (2014) argues that times are changing and that each project team creates its own culture and thus unique forms of tacit knowledge.

Olaisen and Revang (2017a) show how virtual teams create their own work cultures. Non-representable knowing constitutes a part of temporary project culture. Non-representable knowing is a central part of the link between designers, production engineers, and marketing/salespeople. The creation of new furniture designs involves the transformation of non-representable knowing into non-represented knowing and when possible into representable knowing. The latter exchange involves the inclusion of the market and thus the consumers of furniture. The professional designer with 5–7 years of professional training and with extensive product design experience offers a considerable amount of non-representable knowing. To transform the process of sitting in the snow into the design of a chair involves a tacit process that is often challenging for production engineers and salespeople to understand. The idea that a customer can put together three or four parts of a sofa as he wishes is more easily understood but difficult to design. The cooperation of engineering and design knowledge is however needed to make a sofa as stable as possible in one piece. We have found however that the production engineer's role in robotics production is as complex and demanding as the designer's role. The economics and marketing of products are crucial to survival. What we observe is an integration of functions in modern design. The designing job is the most prestigious and challenging, but the introduction of robotics into production has rendered engineering roles more complex and demanding. At the same time, the global market must make adjustments to national and regional preferences. International success for the examined company requires a high degree of integration and rapid adaptation to market changes after launching furniture into the marketplace. Tacit non-representable knowledge must be transformed into tacit non-represented knowing. Non-represented knowing must be converted into explicit knowing. The teams started by sharing their working familiarity and continued to share their nodding familiarity and finally their expert knowledge. They trusted one another through team identification and developed a strong corporate identity through cooperation with upper management personnel. The personnel conversed with confidence, and a continuum of tacit knowledge to explicit knowledge and of explicit knowledge to tacit knowledge resulted. Solutions generated in turn become more important than team members' professional roles.

#### 4.3. Non-represented knowing

The scale of representable knowledge flows toward non-represented knowing. This mode reflects the tacit knowledge that Nonaka and Takeuchi (1995) viewed as transferable through observation. We found that it was transferred to our two teams through social mechanisms. It can be viewed as know-how generated from experiences that individuals, groups or societies have. Orr (1990) described this mode of knowing as "both the ability to do things without being able to explain them thoroughly and also the inability to learn to do them from a theoretical understanding of the task" (p. 170).

Through observation and the rotation of all theoretical and practical tasks, we obtained a stream of observations, reflections, and dialogue pertaining to the transformation of non-represented knowing into explicit knowledge. This transformation mainly occurred through the rotation of work tasks, which also increased the levels of trust among the team members. This trust in turn encouraged the sharing and transformation of knowledge. The confidence and sense of humour of the team members played a significant role in the development of non-representing knowledge. Observations illustrated only a fraction of the transfer achieved through rotation. The team's production engineer nearly completed the equivalent of a Master's course in design and sales through the process, while the opposite was the case for the designers and salespeople. This additional learning thus facilitated the transfer of tacit knowledge into explicit knowledge in the group. The rotation process transferred professional tacit knowledge related to each role to those of other professions, and as a result the teams were able to hold



highly qualified discussions on design, production and market functions. The teams delivered ahead of schedule, and their specifications were set into production only six months after completion. The production engineers translated the teams' specifications into robotics production, and the teams digitalized all organizational processes. This knowledge sharing thus resulted in the integration of all processes. Ekornes plans to use this team process as a model for its design processes.

#### 4.4. Representable knowing

While distinctions among representable knowing, information and data are difficult to make, we have found information and data on how representable knowing is transformed from other modes of knowing. However, such knowing is a product of the context involved. The two teams investigated, interpreted and applied information and data as a means of information seeking. The design of furniture mainly involves the application of non-representable and non-represented knowing, the craftsmanship of production involves the use of non-represented and representable knowing, and market exchange primarily involves the use of representable knowing. The leadership role involves the integration of professional and managerial roles. The three modes of knowing described form part of all four functions. A team consists of individuals who succeed in rendering the whole process collective and integrated. Converting individual knowing into collective knowing involves synergizing and causing two plus two to equal at least five. In Fig. 1, we illustrate the link among the three knowing modes developed through teamwork and the rotation of roles. The ellipses with arrows shown on each end illustrate that knowing can shift in all directions, e.g., towards, from, and within a mode.

The above model visualizes how the different modes interact with one another and how they can shift from one degree of mode of knowing to another. We can see from the figure that non-representable knowing only tangents the different modes. This process illustrates that the non-representable means of knowing affects the other modes, though it is difficult to convert it into more representable modes. What the two teams enabled was a shift into the non-represented and representable modes and a crucial shift back to the use of tacit knowing. These variations were allowed through the observation and rotation of roles.

In the teams, the in-house craftsmen and marketing staff worked well together, while working with the external designers proved more difficult. Societal views of the team members proved essential in adopting the use of collective representing knowledge from which concrete results were pinned down. The rotating of roles allowed the participants to accept and respect their roles, which again encouraged additional learning and creativity. Supplementary learning enabled a

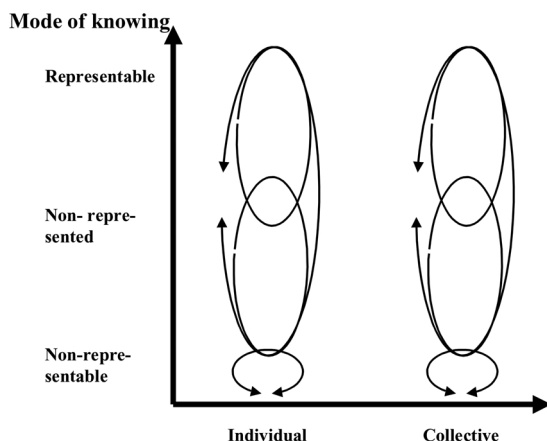


Fig. 1. Modes of knowing.

high degree of mutual trust and respect. Everyone carries biases where, for instance, managerial and sales personnel are viewed as 'necessary idiots'. Rotation eliminates stereotypes, and by trying different positions, the professional learns the complexities and challenges of each role. The rotation approach shifted non-representable knowing to non-represented knowing, and finally to the representable knowing modus. The rotation method was key to the adoption of new knowing modes. Converting non-representable and non-represented knowledge into representable knowledge required creativity, intuition, and imagination (Fig. 1).

Missing in Fig. 1 are the relationships between individual and collective knowing. These missing ties are what we explore next.

#### 5. Knowing as a collective activity

Shared knowing is not something that happens. From common sense, observations and articles we can conclude that shared knowing is the result of a long and continuously ongoing process of uncertainty, conflict, needs and wants. Certain factors must be present for collective knowing to take place, and there also seems to be a need for means or tools that enable shared knowing (Arikan, 2009; Orr, 1990; Tortoriello, 2015). What these are and how they support shared knowing is what we try to establish here.

Blackler (1995) that knowing is purposive and object-orientated. To enable shared knowing, there must be a purpose or objective. A goal does however not merely arise out of nowhere. There must be an identified context or situation from which a need for knowing can arise. Once our adventurers have agreed on a goal and plan on how to achieve it, they must also determine what their current level of knowing is and what knowing is necessary to reach the established goal. The knowledge base of a firm constitutes the core basis of knowledge and of required complementary knowledge (Saviotti, 1998). Complementary knowledge forms the basis for innovation (Esterhuizen, Schutte, & du Toit, 2012). Teams must in turn identify a knowledge gap.

When there is agreement on the knowledge gap at play, everybody must work to close this knowledge gap to be able to achieve the desired goal (Fig. 2). The project team must grow to share knowing to be able to achieve its goal. Social constructionists argue that knowing is found in social relationships between individuals. Shared knowing thus takes place as a group spends time together and gets to know one another. This process may however not be free of conflict. According to Weick (1993), the individual's role as a knower is to take part in the development of shared knowing and in turn influence it. However, when project members of a team have different perceptions of what form of knowing that is needed, shared knowing will take much longer to develop (Nonaka, 1994; Easterby-Smith, Graca, Antonacopoulou, & Ferdinand, 2008; Hotho, Becker-Ritterspach, & Saka-Helmhout, 2012). Performance depends on the conversion of team shared productive knowledge to managerial shared knowledge facilitating business performance.

Available technological platforms have allowed teams to use online

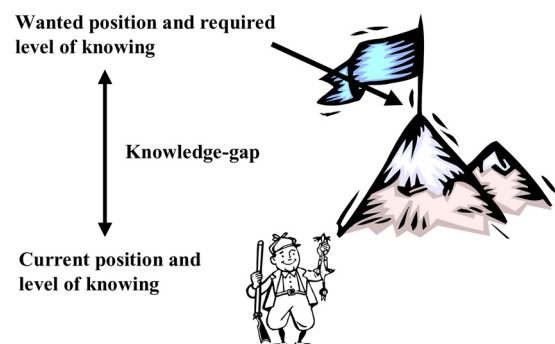


Fig. 2. Knowledge gap identification.



meetings. Online meetings have been found to be as effective as offline meetings. Teams do share their knowledge online as efficiently as they do offline. We have passed the point at which we need to meet physically to enjoy an effective exchange of knowledge. This saves teams time and travel requirements. Teams in turn work smarter and greener (Olaisen & Revang, 2017a).

The team leaders studied have ensured the utilization of external knowledge, and team members have used social media and their social networks to enhance the meta-knowledge of the team (Cao & Ali, 2018). Ekornes uses an information system but encourages all employees to use Facebook, Instagram, LinkedIn and Twitter, as information today is not only individualized but also belongs to the network itself (Yu, Hao, Dong, & Khalifa, 2013). Formal and informal networking has been necessary for the team members. All of the interviewed team members and upper management staff reported that they use social media as a responsible means of communicating and of linking themselves and others as a community. This community is used to identify alternative solutions and unsolvable problems through teamwork. Social technology platforms have created a virtual community that we virtually adapt and work within. The examined teams have worked virtually among themselves and with their networks.

The two investigated teams have combined their socialization and professional work to agree upon new and future conditions and to be able to accept knowledge gaps and what it takes to obtain desired outcomes. The two team leaders have worked to achieve a collective agreement and have sacrificed to agree upon desired outcomes. The team leaders have also worked extensively to have everyone on the team understand their views and that they must work as a collective to achieve desired goals. The team leaders have used conflicts to identify creative solutions. Disagreements have allowed team leaders to facilitate intense discussions to reach agreements whereby everyone compromises but achieves collective bargaining. Both teams have found that this use of conflicts has proven to be an excellent leadership approach. There would be no goals of the day or week if team members were not in agreement with the knowledge gap and positions involved. The teams have celebrated each small milestone throughout the project's development. Lean tools as described by Tyagi, Cai, Yang, and Chambers (2015, p. 205) have been used to facilitate knowledge creation. Two years of work have given rise to 24 milestone celebrations. The teams have contributed until the designed furniture's the market introduction. Relating the processes of modes has created possibilities for innovation, and the management of such processes has been essential in launching new products and services. The pace of this process depends upon market conditions.

## 6. The role of socialization

The initiation of collective knowing requires a shared experience or context. Socialization can serve as an internal network of people exchanging information, ideas, skills, and experience. Socialization creates a context in which communication can take place and thereby also serves as an opportunity for knowledge sharing. Kim (1993); Nonaka and Konno (1998); Boisot (1998) argue that the communication of personal knowledge requires the parties to be co-present and to share in the concrete experiences jointly. Volberda, Foss, and Lyles (2010) define this as a significant absorptive capacity following from Cohen and Levinthal (1990).

Katzenbach and Smith (2015) states "Most team research focus on the logical, rational economic man missing out the irrational behaviour" (p. 103). Interactions between our two teams was, however, dependent upon non-logical situations wherein team members have left their comfort zones. One team member took the other team members on a fieldtrip and asked them to sit in deep snow. Images of their sitting positions were used as models demonstrating how snow can be used to design a chair or sofa. The team has also placed a gutted 12-kilo codfish on a meeting table with the model of a couch placed underneath. Our

findings are crystal clear. Taking the team members out of their comfort zones has facilitated the creation of representable and representing knowledge. The shift from tacit to explicit knowledge has taken the team members out of their professional comfort zones, and this has served as a primary mechanism for achieving transference among the three modes of knowing. When team members are out of their comfort zones, they must rethink their professional roles to understand functions of engineering, sales, and leadership. This rethinking and reworking of roles creates a foundation for transforming knowing of the three modes.

The knowledge management literature describes socialization as the use of planned and directed explicit knowledge (Blackler, 1993; Choo, 1998; Topp, 1999; Nag & Gioia, 2012; Pettersen, 2015). A significant finding shows that socialization represents tacit knowing. Socialization encourages the use of explicit knowing. The studied team members can drink, ski or paddle together without achieving anything else but sharing what they already know. The team leaders did not plan this socialization process, and they allow the team members to engage in socialization together. The rotation of roles has brought about another form of socialization through which individuals reflect on their own and other's professional positions. The socialization process took a long time to manifest and started to work fully after the first year. Socialization was in one respect planned by upper management and the team leaders, while also being unplanned and undirected. The teams did not engage in extensive travelling or physical activities in their socialization. Socialization became a part of professional work through the sharing of milestones and through the identification of solutions drawn on napkins at team parties. The socialization process facilitated the transformation of tacit knowledge, as the process helped everyone trust one another.

Upper management directed the teams to create a relationship-focused culture based on a rules, risk taking and a focus on results. These cultural features represent the values and norms of Ekornes (2018). They also reflect the socialization, combination, externalization and internalization of knowledge (Vick, Nagano, & Popadiuk, 2015). Ekornes balances project agility with project performance to allow for autonomy alongside both power and control.

## 7. Mental models

There are both individual and shared mental models (Kim, 1993; Nag & Gioia, 2012). During socialization, an individual's conceptions, understanding, and mental models change. However, the redefinition of different mental models can only take place when people face a situation that is relevant to them (Rosendahl et al., 2014). An individual must experience a position that affords him/her an alternative set of assumptions that is appealing – an alternative set of assumptions that they think can help them understand or cope with their reality in a better way. When this does not occur, there is no need or incentive to change mental models, and there is thus no reason for knowing to take place (Argyris, 1994; Tortoriello, 2015; Olaisen & Revang, 2017b).

Kim argued that "(u)rganizational learning is dependent on individuals improving their mental models; making those mental models explicit is crucial to developing new shared mental models" (44:1993). Rendering mental models representable can however be difficult. This may also be an uncomfortable process because by expressing our deeply rooted assumptions we also expose them to critique and revision. Blackler (1995), however, argue that incoherencies, inconsistencies, and conflicts create opportunities for learning. In facing incoherencies, contradictions and conflicts, an individual is exposed to alternative assumptions and can thereby choose to adopt these or continue to use old ones (see Fig. 3 below). To be forced into new realms, new models must be adopted to develop new furniture designs. New assumptions and models are made when team members leave their traditional comfort zones. Knowledge in itself does not move them forward. They must act practically. Non-representable and non-representing knowing

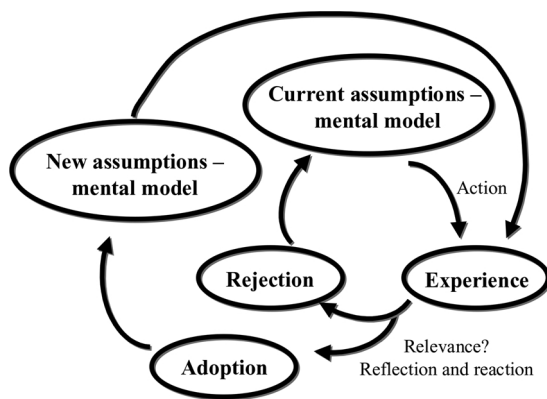


Fig. 3. Development of new mental models.

are converted into representing knowing when a team leaves its comfort zone into a new stage of co-creation. This team co-creation allows the team to climb all the way to the summit of the mountain. New mental models have afforded the studied members the flexibility they need to work together to create innovative and functional furniture. The two teams have capitalized on their model's strengths. The teams have created several models of the furniture, which were presented to corporate leadership personnel to help them understand that they had a choice and a say. Knowledge used was a combination of constructed and factual knowledge. Elements of constructions were indistinctly used as facts and vice versa. Different forms of knowledge are not epistemologically mutually exclusive as noted by Serna (2012). Knowledge used in a team is contextual. We determine what is true and not true, what is and is not acceptable, and what is and is not adequate depending on the situation. Our assumptions and mental models are changing and flexible. Plessis (2008) expressed this clearly with the following quote: "The spirit of knowledge management may be defined as individually knowing what we know collectively and applying it" (p. 286).

We found that the two teams acted practically and communicated, interpreted, improvised, negotiated, enacted, re-enacted, unlearned and learned. These processes enabled the teams to identify new assumptions and models.

The development of shared mental models affects both non-represented and non-representable knowing at the individual and collective levels. As individuals face new situations and meet new people, their assumptions and thus mental models are revised. Depending on the context, they also develop some degree of shared knowing, some of which becomes deeply rooted in the collective culture (and thus non-representable) and some of which is more easily expressed as knowing. The current state of collective non-representable knowing and shared mental models will have a substantial impact on future collective knowing like individual mental models. Even when this depends on the present state of knowing, this reflects a new state of understanding that will create a new way of looking at furniture. We must ask what is new about a given piece of furniture. The answer is that the furniture in itself represents a new mode of design and functionality. The company's couch composed of multiple pieces allows the customer to configure a couch as desired that is as stable as a couch consisting of one piece. Tacit proper knowledge has moved into collective explicit knowledge through design, production and market exchange. This process involves societal and professional meetings and business meetings to create a new product. To address further complexity and ambiguity, the teams play multiple roles to bring them together, determine what they do and do not know from knowing modes, and apply what they know to a real piece of furniture. Both teams in the end convert "what we do not know that we know". The transformation of tacit knowledge into explicit knowledge ensures this result.

## 8. Communication, language, and metaphors

Weick (1993) stated that "language is both the tool and the repository of learning. It is the critical tool for reflection, both at the inter- and intra-personal level. Additionally, language is a social phenomenon or stated differently, learning is embedded in relationships or relating knowledge is an inherent property not of an individual or an organization, but rather resides in the quality and the nature of the relationship, between levels of consciousness" (p. 18). Hence, language is a tool that helps individuals and collectives render their knowing representable. When our team members speak to one another through group socialization, their knowing becomes a part of shared knowing.

Nonaka (1994) supported Weick (1993) when he argues "... communication is like a wave that passes through people's bodies and culminates when everyone synchronizes himself with the tide. The sharing of mental and physical rhythm among participants of a field through metaphors may serve as the driving force of socialization" (p. 105). Our empirical approach does not stress the importance of metaphors. Our team members did not speak in metaphors. They used professional language very directly and without metaphors. They quarrelled among themselves regarding which group was the best: the design, production or marketing team. They understood that they needed to use their collective knowledge to deliver their designs to the market. Ordinary people do not use metaphors or advanced wording as they work. Communication is the essence of simplicity and simplicity is the essence of selection and priority. The rotation of roles rendered the interface more exact, direct and open. Attitudes were more frequently expressed through body language, and the teams did not need to dedicate as much time to communication. The more the teams worked together, the simpler we found their arguments and priorities. Simplicity in communication and language is critical to success. The development of simple communication in both teams facilitated the transformation of tacit knowledge into explicit knowledge. The closer the teams worked, the simpler their communication became. Simplicity may be the ultimate facet of a high-performance team.

## 9. Observation and imitation

Barney (1991); Spender (1998); Baumard (1999) and Hotho et al. (2012) argued strongly that individual non-represented knowing is of limited value to an organization when it remains personal. Knowing must be representable and then used for innovation and product development. Through observation and imitation, the observer can both internalize collective non-represented knowing and contribute to its development. Let us take hikers as an example. On their hike, they meet a man who wants to join them. To understand the group's prevailing culture and unwritten rules, i.e., non-representable knowing, he must follow the group members and watch their behaviours as they approach their goal. If he regards their conduct as relevant, he will imitate it and adopt shared non-represented and non-representable knowing. However, if he actively participates in the hike, he will also share his own non-represented and non-representable knowing and thereby affect shared knowing. External furniture designers of the examined teams offer vital external knowledge.

Fig. 4 illustrates dynamics of individual and collective knowing. The ellipses with arrows on both ends show how knowing moves within and between modes and collectives. As is shown in Fig. 1, non-representable knowing serves as a basis for other modes of knowing, as it filters the impressions, alternative assumptions and mental models that a group adopts.

From the above figure we also find the means or tools that enable and support the link between individual and collective knowing. Socialization contributes to all modes of knowing but is of particular importance for non-represented and non-representable knowing. We illustrate this with a horizontal ellipse that connects individual knowing to collective non-represented and non-representable knowing.

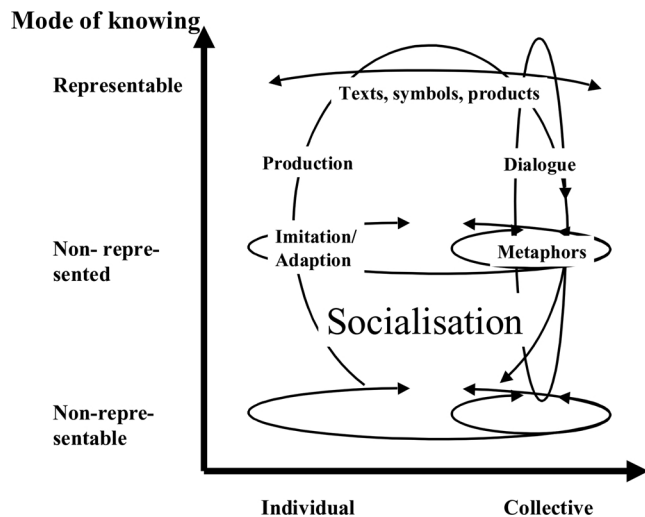


Fig. 4. Knowing as a collective project activity.

Socialization contributes to both personal and collective knowing because it illustrates the challenges of individual and shared mental models. Socialization and dialogue afford individuals an opportunity to develop and share metaphors and stories relating non-represented knowing to non-representable knowing (illustrated by the vertical ellipse flowing through all three meaningful modes). We use texts as a means of distributing metaphors and stories. However, as documents are static, only a one-way link from representable to non-represented knowing is established. Dialogues, on the other hand, allow for the interactive development of a story. In Fig. 4, the line that links the individual to collective representable knowing illustrates this.

Texts, symbols, and products are tools that primarily support individuals' represented knowing. An individual who creates solutions and solves problems by producing goods or services contributes to collective knowing. In the figure this is visualized by the arrow running from individual non-representable knowing through non-represented and representable knowing and then through the standard knowing modes. While the opposite case, where collective knowing contributes to one's own knowing, can of course also occur, we choose not to focus on this link here. We thus also do not discuss dynamics of personal knowing.

Observation, imitation, and adaptation enable both personal and collective knowing to take place, but they are of particular importance when a team is to share non-represented and non-representable knowing. The socialization process adopted by the furniture teams allowed the team members to trust one another in sharing all available information and knowledge. Socialization cannot be designed or planned and constitutes part of the tacit knowledge of the three knowing modes. The goal was to identify innovations, and in turn, new chairs and sofas were produced as prototypes over two years with the intention for them to reach the market within three years. The teams also work quickly to enter the marketplace faster. One of the teams took 22 months rather than 24 months to complete the design process and delivered a new sofa to the market within 30 months. The other team completed its design and spec proposal within 24 months and introduced a chair to the marketplace within 30 months. Ekornes has decided to automate its production of new furniture as much as possible with the use of new robot technologies, shortening the length of time between design and marketplace entry. This has been the case for two reasons: detailed team specifications and upper leadership involvement throughout the design process.

## 10. The pace of sharing knowledge: a proposed conceptual framework

What we have not accounted for hitherto is the speed at which knowing takes place. We share knowing at different pace depending on what mode the pace is in and how well a team is socialized. We share representable knowing instantly, whereas non-representable knowing can take years to share. Both of the studied teams delivered their products to the marketplace in time. They became high-performance teams that started out less efficient and eventually entered the fast track. We assume that starting slow is necessary to achieving full role rotation and socialization.

All knowing takes place over time, but at what pace is determined by how well individuals know one another and by what means they use to support knowing. Our understanding is not that the more time people spend together in planned socialization the faster the pace at which knowing becomes collective. The socialization process is, in our view, very tacit. We can design, plan, manage and determine this process. When the studied team members rotated their roles and broke out of their comfort zones, the unplanned socialization process caused them to them move back and forth through modes of knowing. Tacit and explicit knowledge interact along a continuum of modes. Such interactions convert personal tacit knowledge into collective explicit knowledge. Personal obstacles to such conversion are removed to obtain a collective modus linked the process shown in Fig. 5. This process involves a complete collective conversion of tacit knowledge into explicit knowledge at a fast rate. The studied team members and their corporation have developed a high-performance team culture. The company's team culture fosters autonomy to facilitate knowledge integration by enhancing trust among team members (Basaglia, Caporarello, Magni, & Pennarol, 2010). This culture has led team members to be more inclined to share and integrate knowledge for team and corporate success.

Both teams viewed the conversion of learned practices into explicit and usable knowledge for Ekornes as beneficial. This corporate identification contradicts the findings of Janhonen and Johanson (2011). The two teams achieved success through modes of working managed by their corporation. There is a misunderstanding in the team literature that this cannot be managed (Katzenbach & Smith, 2015; Olaisen & Revang, 2017a). Our survey shows that this process can indeed be managed and controlled through close collaboration between upper management and project teams. Scandinavian values of equality, co-operation, trust, and commitment are essential. Ekornes' plan is to direct and manage all processes, however. The use of robot technologies

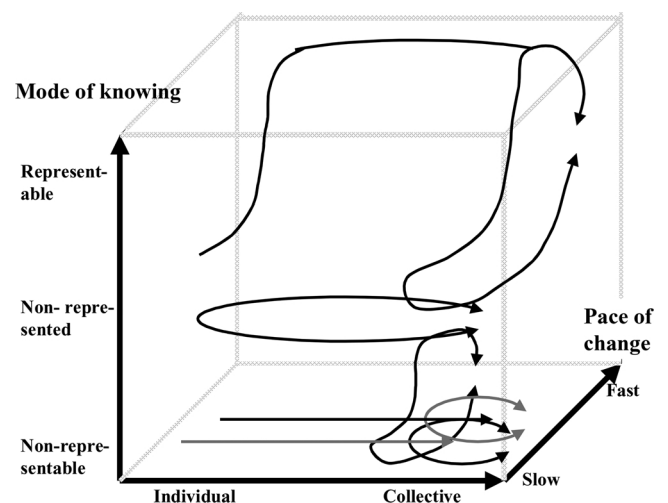


Fig. 5. Pace of understanding observed within a group and between individuals and groups.

to achieve the highest possible levels of efficiency is adopted as part of the design process and is accepted by the company's production workers. Advanced technologies used are transferred to other realms of production by leveraging experiences gleaned from this project to improve lines of production. The profit sharing approach renders employees eager to use new technologies.

Nonaka (1994) argued that interactions between tacit and explicit knowledge become more substantial in scale and more efficient as more actors within and around an organization become involved. This may be the case because the more people there are in a group, the more diverse individual knowing is and thus the more challenging assumptions and mental models applied become. However, the pace of change involved is also dependent on team structures, leadership styles and environments used for team cooperation. The two teams studied enjoyed high levels of team and organizational identification while avoiding disparities in knowledge sharing, which enhanced sharing, transfer and learning capabilities (Zhu, 2016).

In Fig. 5, we illustrate the dynamics of understanding found within a team and between individuals and groups.

The greyed-out lines in the figure illustrate that there are no perfect ends of the scales. In a new team, it takes some time for team members get to know one another, to define their individual roles, and to develop a shared culture and shared mental models. This process took a year for the examined teams to complete via role rotation. The black circle shown in the lower right-hand corner illustrates this. Further, in the early stages of team establishment, the new members had more influence than when the teams are more established. A lack of an actively shared culture makes it easier to influence the development of a collective culture. The studied team members did not have a shared culture to refer to at first and thus were able to create a collective culture. The black line running from individual to collective non-representable knowing illustrates this. The grey line shown below, on the other hand, illustrates that once a team culture was defined, the team tended to be sceptical of new ideas and assumptions, making the culture more difficult to change. While our teams worked well in developing innovative furniture, in the end, they developed a typical model. The pace of non-representable knowing is faster when project team members get to know one another through role rotation. As we conclude above, the adoption of rotation methods is slow at first and then accelerates throughout the process. Support of the teams from corporate leadership proved essential.

The line running from personal non-represented knowing to collective non-represented and non-representable knowing illustrates how individual know-how can affect collective knowing. When an individual leaves the non-represented mode from the representable mode, the process is somewhat slow. The rotation of roles accelerates this process. However, individual representable knowing is converted into collective representable knowing faster, while the conversion of knowing into the non-representable mode occurs more gradually. We found that, after the first year, the team members quickly switched between modes of knowing. Once the team members had left their comfort zones, they found it easier to remain there. This finding contradicts nearly all research results describing this process as time intensive.

## 11. Upper management's perspective

We held a debate with Ekornes' upper corporate management team. We discussed the follow question: what has been critical to the success of the two teams?

The main answer given is crystal clear. What has worked is the balancing of leadership and management power. The teams were given direction on what they must deliver as well as a clear plan and time-frame for delivery. Expectations were made crystal clear. The teams could decide how to organize and work, but upper management personnel required that a report on the teams' progress be submitted every three months. Upper management personnel regarded their role as

crucial to the generation of results. They supported and controlled the teams throughout the process. Liu and Phillips (2011) also documented the crucial importance of leadership for knowledge creation in teams. In their view, leadership controls the balance of team freedom and team control. The upper managers studied guided the co-creation of innovation, costs, quality levels and the amount of time to market entry. Standalone tacit knowledge developed into explicit knowledge shared among upper management personnel. This knowledge proved instrumental to the planning and execution of the production process.

The upper management team elected one representative to serve in each design team. This role was initially designed as a standalone managerial role related to upper management concerns. In the end, each representative served as a manager who shared team results with upper management staff, affording upper management personnel tacit knowledge of the teams.

The external designer knew that the project involved would shape the design company's reputation in Scandinavia. Members of the team were pressured to deliver results through this top priority project. Upper management staff regarded this as involving a combination of leadership (giving direction) and power (they needed to succeed). Upper management staff met and discussed the teams' progress and expectations to place on the teams. As a practical implication, power, control and follow-up meetings are essential to self-governed teams. No bonuses were given for results, as the upper management team regarded inner motivations as central to achieving results in due time.

## 12. The productive performance of tacit knowledge

The teams worked together with upper management personnel for six months to automate the production process as much as possible. Ekornes wished to use robotics production systems to render its production system as cost-effective as possible. Cooperation among the teams, upper management personnel, and production workers and their trade union worked very well. The plan was to create new furniture to illustrate how robotics could be used for full furniture production. The teams, production workers, and upper management staff worked as an extended working group to solve all relevant problems over a six-month period. The teams served as mediators between upper management personnel and the production workers and their union. The teams secured the cost, quality and the timing of the process. The teams operated as translators between workers and upper management personnel. Upper management personnel regarded this form of management as involving the application of tacit administrative knowledge that they had not known or used prior to this process. The managers had not known that these translation resources existed. The extension of teamwork into the production process was a great success for both upper management personnel and the workers. The process secured the company's profitability through more extensive production while maintaining a workforce of the same size.

## 13. Conclusions: key findings and theoretical and practical implications

### 13.1. Key findings

The key points emerging from this work are as follows:

- 1 The driving force behind team collaboration and socialization for the case examined was the rotation of professional roles. Such rotation forced each team member to rethink his position and in turn his approach to collaboration, sharing and knowledge transfer. The creation and adoption of new team roles converted tacit knowledge into collective explicit knowledge. The transfer of tacit professional knowledge most efficiently occurs through the rotation of team roles.
- 2 Upper management personnel directed the teamwork while



balancing the freedom and control of the teams. Follow-up meetings and support from upper management proved crucial to the teams' success.

- 3 The transformation of tacit professional knowledge into actionable explicit knowledge in teams can be planned, managed and controlled.
- 4 The two teams studied enjoyed high levels of team and organizational identification while avoiding disparities in knowledge sharing, facilitating sharing, transfer and learning capabilities.
- 5 Corporate and external social media served as essential tools for networking as a learning community. Online team meetings were as efficient as offline team meetings. Social technology platforms serve as a virtual community that we are virtually adapting to and working within.
- 6 The team participated in the automation of furniture production and secured the quality and cost- and time-effectiveness of the process. The teams operated as translators between production workers and upper management personnel. Production AI robotics was introduced as a facet of teamwork and as a sign of progress for all stakeholders involved.

### 13.2. Theoretical implications

- 1 Many studies show that tacit knowledge in a team cannot be communicated or shared with other team members or applied to the practical tasks of a team. We found that when we rotate all professional roles of a team and bring participants out of their professional comfort zones, tacit knowledge can be shared and converted into explicit knowledge.
- 2 Few empirical studies have attempted to differentiate the benefits derived by an organization from tacit knowledge and to specifically show how tacit knowledge enhances performance. We found that the benefits of shared tacit knowledge enhance team and corporate performance in terms of delivering on specifications in time at the right cost for new products ready for automated production.
- 3 We found a relationship between the tacit knowledge of upper management teams and that of the two designing teams. The translation of symbols and tasks between upper management personnel and the teams involved the use of shared explicit managerial knowledge. Team participation initially involved the delivery of standalone managerial tacit knowledge for upper management representatives and ended up involving the delivery of shared managerial tacit upper management knowledge. We identified the existence of productive and of management-based tacit knowledge. Tacit managerial knowledge related the knowledge of management groups to that of the teams, while productive knowledge connected the team members. Expert, working familiarity and nodding knowledge are personal and collectively related to conversable, productive and managerial situations. Relationships between productive and managerial tacit knowledge form holistic tacit knowledge. The conversion of holistic tacit knowledge into explicit holistic knowledge shapes business performance. Leadership, organizational processes, technologies, and tools are linked to meet market demands. Business flywheel rotation ensures explicit performance and a competitive advantage in collective tacit knowledge.

### 13.3. Implications for practice

Our findings have several practical implications for the creation of high-performance knowledge teams and for the performance of tacit, productive and managerial knowledge. The present study reveals a flywheel effect of corporate performance first through the creation of high-performance knowledge teams for innovation. Teamwork should be designed, planned and monitored on by upper management personnel. Upper management teams must identify new and innovative products and services and implement them. Engagement with

innovation teams keeps corporate directors close to front-end professional innovations, new production technologies, and the marketplace. The participation of upper management must involve a team member who continuously reports to the group to ensure support from upper management personnel to teams. Team reports must also be created every three months to keep teams accountable and to create room for feedback and adjustments. Reporting standards also maintain a sense of team urgency.

Role rotation in teams must also occur every fourth months or six times over the course of a temporary team project. Continuous role rotation allows team members to break out from their comfort zones and to convert professional and tacit knowledge to explicit knowledge and vice versa. Team can in turn generate productive tacit knowledge for new services and products. Upper management personnel can participate in tacit productive knowledge formation and report back to upper management. Upper management personnel can in turn acquire tacit managerial knowledge through the connection of groups and teams. This linked process creates synchronicity in business actions.

A balance of leadership (giving the direction) and power (control, role expectations and time limits) is essential. The balance of team autonomy and leadership is key to understanding why teams succeed. This balancing act ensures that the process is managed and controlled even with a considerable degree of autonomy. As a practical implication, the balance of power and autonomy is central to the conversion of tacit knowledge into explicit knowledge. Upper management power and control secure the transformation of productive tacit knowledge into tacit managerial knowledge. Tacit managerial knowledge is in turn translated into explicit business action. Teams should propose production plans. Business decisions should involve drawing up a production plan on costs, quality levels, profits, time to market entry and suggestions for robotics production. Team should act as translator between upper management personnel and production groups regarding automated production. This mediating role can in turn remove top-down tension and encourage lateral collaboration for win-win results.

Several factors support flywheel rotation. One is the celebration of small wins. The examined teams celebrated 24 minor goals achieved over 30 months, four were celebrated with upper management personnel, and three were celebrated with the production workers. Minor wins show that we are on track and create a sense of confidence and togetherness.

Today, social networking is a part of working life. Internal information systems should be used together with external social media sources. Active networking professionals may possess more current information and may have more information and knowledge to share. Upper management teams should both participate in and promote social networking.

No personal bonuses should be given during the development period. New products and services can in turn be created through emotional learning and from knowledge motivation. Team members can also in turn create together without upper management, team or production bonuses. Bonuses should be given to all those involved when there are actual profits to share.

Planning is vital to all processes. Planning takes time, and it must be allowed to take time. Adjustments and changes should be possible to make within planned costs and timeframes. Innovation teams should be kept small, and corporations should use two teams rather than one large team, and at least two external team members should be involved.

Practically, is it possible to create a corporate flywheel from tacit knowledge? The conversion of productive tacit knowledge into tacit managerial knowledge that is converted into specific business action creates an explicit corporate flywheel while maintaining tacit knowledge as a competitive advantage.

### 13.4. Limitations and future research

Knowledge creation is not separate from the context in which

knowledge is created. Our empirical data were drawn from two teams working in one country (Norway), allowing us to conduct an in-depth longitude study. However, we in turn could not compare national contexts. We encourage the examination of teams related to upper management groups in other national contexts.

In closing, our focus on the role of various forms of tacit knowledge reveals different ways in which such knowledge can be explored and exploited by one Norwegian furniture producer. Distinctions made between productive and managerial knowledge related to business situations also reflect the strength of tacit knowledge as a critical resource. Future research must build on the many ways that firms can explore and exploit their tacit knowledge.

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