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Leveraging Intellectual Capital Management in Virtual Teams: What the Covid-19 Pandemic Taught Us

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Abstract: This study undertakes a review of the scientific literature on the role and impact of Intellectual Capital (IC) with all its components (human, structural and relational capital) on Virtual Team (VT) work. As already proven in the discipline research, IC as a summum of organizational knowledge resources plays a fundamental role in the knowledge economy in sustaining competitive advantage, innovation and performance. Despite an abundance of papers investigating VTs from both a theoretical and empirical perspective, a surprising discovery has been made during this research. The extent of work dedicated to analysing the relationships between IC and VTs is minimal, notwithstanding the unprecedented expansion of the use of VTs since the beginning of the Covid-19 pandemic. Following a first review of the extant literature regarding IC and VTs, a second literature review has been conducted for the benefit of revealing crucial aspects and the newest best practices in what concerns work in VTs. In doing so, the authors attempt to draw attention to the need for in-depth researches in the IC field, to catch up with the business, economic and societal most recent developments. Furthermore, this study aims to provide the practitioners with up-to-date, concise knowledge on the practical aspects relevant for the work in VTs.

Keywords: intellectual capital management; virtual teams; COVID-19 pandemic.

Introduction

Business and societal responses to the Covid-19 pandemic-related physical restrictions have provided new opportunities for insights into the benefits and challenges associated with working in Virtual Teams (VT). As envisaged by Gallup (2022) on the basis of a large US sample inquiry, hybrid work is the future for most companies' workforce (53%), while fully remote work will include 24% of workers and only 23% will work on-site. Failure to offer flexible work arrangements will negatively affect organizations in what regards employees' workplace intention and retention. In addition, workers perceive that work form flexibility is related to their engagement and well-being. However, staff still wish to remain connected with their co-workers. This insight sheds light on the importance of underlying facts concerning human resources, social interactions, organizational structure and culture, and technological capabilities.

The digital economy has continuously accentuated the importance of the organizational intangible assets for achieving financial performance and productivity. In a dynamic and competitive business environment that relies on knowledge more than ever, the value of the intangibles in creating competitive advantages becomes unparalleled (Subramanian & Youndt, 2005; Bratianu, 2018; Dean & Kretschmer, 2007) and a strong factor for greater productivity, efficiency, and overall profitability (Berzkalne & Zelgalve, 2014). Furthermore, the knowledge resources created, acquired, applied, shared, stored and permanently updated are nowadays essential for companies in various industries and sectors. An ever increasing number of organizations become aware of the intellectual capital that resides and accumulates within their remit. It is important, therefore to

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understand and unveil how can organizations monetize on IC resources even in a non-traditional, virtual work environment. Nevertheless, the literature that addresses the relationship between IC and VTs appears to be scarce, as few studies have integrated the two research fields, by discussing how IC management can influence the value creation in virtual teams (e.g. Harvey, Novicevic, & Garrison, 2005; Suchan & Hayzak, 2001, Striukova & Rayna, 2008, Alavi & Tiwana, 2002).

As researchers hasten to catch up with the underlying rationale and the flourishing practices concerning the new virtual work arrangements in the Covid-19 pandemic context, the question arises as to how the conceptual framework that has been previously built fits the realities of the new normal. Apart from the expected academic interest, such studies aim to fill obvious knowledge gaps and to support practical managerial purposes. Many aspects concerning virtual teamwork and specific IC dimensions and elements such as work-related competences and know how, managerial approach, organizational culture, networking inside and outside organizational facilities, information systems, and so on and so forth are just starting to be empirically tested, therefore it is to be expected that the dedicated literature will proliferate. This study aims to take stock of the extant body of knowledge concerning the research on the topics of IC and VTs and their outcomes, and more specifically to identify and appraise to what extent the recent developments regarding the virtual workplace have confirmed the academic expectations. Moreover, the paper attempts to reveal the most recent best practices developed to facilitate and advance work in VTs.

Conceptual framework

Intellectual capital encompasses all the knowledge resources available to an organization, that can be valorised for various purposes (Buenechea-Elberdin, Saenz, & Kianto, 2018). IC is traditionally treated in the field literature as being shared between human, structural (organizational) and relational capital (Edvinson & Malone, 1997; Petty & Guthrie, 2000; Herremans, Isaac, Kline, & Nazari, 2011). The human capital refers to employees and executives, and includes the sum of employees' education, experience, competence, knowledge, skills, innovativeness, attitude, commitment, wisdom, and creativity (Bontis, 1998; Wang, Wang, & Liang, 2014). It represents the individual knowledge stock of an organization utilized to reach certain targets (Pablos, 2002). The human capital is the first dimension of the IC, because a highly skilled workforce can contribute to improve business processes, can make the company more competitive and valuable, and can contribute to the organizational development (Vătămănescu, Andrei, Dumitriu, & Leovaridis, 2016a). Structural capital is embedded in the entire organization (Pettie & Guthrie, 2000) and it is represented by the non-tangible organizational capabilities, organizational structure, organizational culture, routines, procedures, process manuals, strategies, information systems, hardware, software, databases, company images, patents, copyrights and trademarks (Bontis, 1998). It comprises all the valuable intangible assets that employees cannot take away when getting off work or leaving the organization (Edvinsson & Malone, 1997). Relational capital is the most complex dimension of the IC, because it consists of all the relationships developed between the internal intellectual resources and the external stakeholders and it speaks about the organizations as dynamic and open systems (Vătămănescu, Zbuchea, Pînzaru, & Andrei, 2016b).

Other authors put forward different dimensions of IC, such as "renewal capital" referring to innovative solutions, products and services available to the firm (Kianto, 2007, 2010), and "network–based capital" described as evolving from consistent interactions among human, structural and relational resources within complex and dynamic online social networks (Vătămanescu et al., 2016a). Relational capital becomes particularly relevant in the virtual environment and in networking contexts, as the social capital developed by individuals and organizations is the basis of numerous benefits (Nahapiet & Ghoshal, 1998) and the foundation for the knowledge creation and sharing. Virtual teams used to cater for the young generations' aspiration of mobility and flexibility in the workplace

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(Cristea & Mitan, 2017; Großer & Baumöl, 2017), however, they respond currently to extended socio-economic needs, following the global healthcare crisis induced by the Covid-19 pandemic.

Virtual Teams. Despite being studied for decades there is no commonly accepted definition of VTs (Lipnack & Stamps, 1997, 2000). According to Henry, Le Roux and Parry (2021), there are so many overlaps in the literature between the terms *telework, distributed work, remote work and virtual work***,** that any knowledge worker could be called a teleworker and any organization is to a certain extent, virtual. As a consequence, the authors consider superfluous the attempt to any conceptual distinction. Nevertheless, they propose that the term "virtuality" should refer to interdependent work activities, in relation to which communication and coordination is mediated by ICTs. Furthermore, the authors posit that distributedness of work should be defined by the degree of geographical distance between places and the amount of time allotted to work in separated physical locations.

The academic literature has traditionally agreed on several characteristics of VTs, seen as groups of individuals (e.g. employees, collaborators, partners), geographically dispersed, who work together on common projects, and who use information and communication technologies (ICT) to reach their purposes. Technology enables synchronous and asynchronous communication and provides professional tools, thus VT leaders are expected to develop specific managerial abilities to interact on social networks, have a global way of thinking, capacity to adapt to multiculturalism, and be active online extensively (Trivedi & Desai, 2012).

VTs allow quick access abroad to talent (people) and resources (information and knowledge) with no boundaries (Serrat, 2017). Most of the literature on VTs has proposed that, given their peculiar structure and characteristics, leadership in VTs should consider delegating the power and the accountability between team members (Kirkman, Rosen, Tesluk, & Gibson, 2004), therefore the Leader-Member-Exchange concept (LMX) (Gilson, Maynard, Jones Young, Vartiainen, & Hakonen, 2015) embodies important aspects in the IC-based research, giving particular relevance to human and relational capital. From the structural capital perspective, VTs have flat hierarchies, to facilitate access to information, process flow with fewer boundaries and frequent exchanges between the team members. As a consequence, clear rules, procedures, standards and routines are required, to achieve the set goals and to avert the limitations of the lack of face-to-face interaction, and to prevent misunderstandings (Hoch & Kozlowski, 2014).

Extensive (theoretical) research has been dedicated to VTs, stressing their limitations and advantages, but few empirical studies were able to prove various assumptions (Malhotra, Majchrzak, Carman, & Lott, 2001).

Methodology

The present study has reviewed the academic literature dedicated to the concepts of virtual teams and intellectual capital management, with the purpose to reveal the recurrent variables associated with these concepts. To this end, a search has been conducted in the Web of Science (WoS) and Scopus data bases using the terms ''Intellectual capital AND virtual teams". The inclusion criteria comprised articles published in journals, written in English, in the fields "Management", "Business", "Multidisciplinary Sciences", "Behavioral Sciences" and "Sociology". This search has returned only 10 results in WoS and 8 in Scopus, of which 3 papers in WoS and 1 in Scopus have been excluded after examination of their abstract and content. The 7 remaining articles, retrieved in both data bases were all but one published before the beginning of the Covid-19 pandemic. The authors aimed next at identifying and analyzing the most recent literature on the topic of work in Virtual Teams in the context of the Covid-19 pandemic, which offered the occasion of a reality check for the theories previously advanced, as individuals, organizations and countries had to switch suddenly from

traditional to virtual interactions due to the global crisis that ensued. A second search concerning VTs was run for the period 2020-2022. Since all societies and organizations had to get accustomed on short notice with virtual work forms at unprecedented rates, this situation has been duly reflected by researchers. As a consequence, 113 articles have been identified and analyzed in the end (including the 7 articles selected during the first search).

Findings and discussion

Intellectual capital management in virtual teams

The literature on the topic of IC management in VTs is very limited. Seven journal articles have been identified, out of which two propose theoretical frameworks for organizational IC employment in the leadership of internationally dispersed teams (Van Zyl & Hofmeyr, 2021; Sarker, Sarker, Kirkeby, & Chakraborty, 2011) and measurements for IC and knowledge management impact in e-collaborations, respectively (Capece & Costa, 2009). The body of work is just starting to extend, following the recent publication of research conducted during the Covid-19 pandemic. Previous literature has pointed to the role of IC and particularly social or relational capital on VTs achievements. Gao, Guo, Chen and Li (2016) proposed that by harnessing the benefits of IC and especially social capital, the performance of knowledge collaboration in VTs increases. In the same vein, Dissanayake, Zhang and Gu (2015) have posited that VT performance is significantly affected by a team leader's social capital and the team experts' IC. Vorakulpipat, Rezgui and Hopfe (2010) have stressed the value of IC and especially social capital for knowledge creation in VTs. The newest empirical research by Radonić, Vukmirović and Milosavljević (2021) has asserted a significant positive influence of the teleworking model on all IC components – human, structural, relational and innovation capital - in the Serbian ICT sector during the pandemic.

Related literature on IC, dispersed teams and the use of ICT has provided additional relevant knowledge on the topic. While studying a large group of Italian R&D managers working in international teams in the field of manufacturing, Mazzucchelli, Chierici, Tortora and Fontana (2021) have confirmed that social capital and IT play a crucial role in strengthening knowledge sharing and innovation capabilities in SMEs with geographically distributed teams. These results are in line with those of Kucharska's (2021) work, which has established in the framework of a large empirical research across industries and sectors in Poland, that transformational leadership which is focused on innovativeness and management of knowledge processes leads to development of all IC elements. Furthermore, sharing tacit knowledge in a voluntary manner positively impacts human and relational capital growth in various sectors (IT, construction, high education, healthcare). An organizational learning culture which encourages formal knowledge processes significantly affects structural capital in the IT industry. Similarly, a research concerning the top innovative companies in the world, competing in the context of Industry 4.0 revolution which blurs the lines between the physical and the virtual world, has revealed the impact of human capital efficiency on a firm's performance and the importance of strategies to acquire new competencies and skills for an organization's innovativeness (Li, Nosheen, Haq, & Gao, 2021).

Virtual teams dimensions

VTs are considered in the academic literature from the dimensions of geographical dispersion (global vs. local), relation to an organisation (inter- vs. intra-organisational), continuity range (temporary to permanent) and virtuality range (virtual, hybrid, or face-to-face). Unlike previous VTs, the ones that spread during the Covid-19 pandemic tend to be local, have a low degree of diversity and are hybrid by default (Chamakiotis, Panteli, & Davison, 2021).

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According to Isaac, Herremans and Nazari (2017), virtual work models offer greater flexibility for both individuals and organizations, empowerment of team members, competence outsourcing options, easier connections to suppliers and consumers, administrative cost cuts, reduce environmental impact, boost regions with poor infrastructure and employment rates, allow convenient integration of disabled persons. Morley, Cormican and Folan (2015) see both advantages of working in the virtual space (technology enables communication, recording, contacts, etc.), time and structure flexibility, knowledge access and diversity, as well as disadvantages (lack of personal contact, restricted tacit knowledge sharing, potential for misinterpretation and conflicts, cultural differences).

The academic works on VTs abound in proposing and analyzing various structures, forms, functions and work practices in what concerns flexible work types in the virtual environment, in dispersed teams at global and local levels, in corporations and SMEs, in a variety of industries, from numerous organizational and cultural perspectives, positing various challenges and success factors. As Abarca, Palos-Sanchez and Rus-Arias (2020) have identified during a structured literature review, the main themes in respect of VTs refer to leadership, tasks, trust, communication, cultural diversity, cohesion, distribution, performance and empowerment. Maznevski and Chudoba (2000) have built a theoretical framework that describes the global VTs' dynamics and effectiveness bases, and comprise structural characteristics concerning organization, task and technology, and decision processes regarding information gathering, problem solving, idea construction, decision-making and commitment.

According to Handke, Klonek, Parker and Kauffeld (2020) VT success factors include effective leadership input and empowerment; effective communication and coordination; maintaining trust; effective technology, information, culture and performance management; adaptation. On the other hand, there are also challenges, pertaining to five categories: geographical distance (affecting motivation, awareness, trust, informal communication), temporal distance, perceived distance (symbolic/identity), complex inter-dependent tasks, leadership issues, the configuration of dispersed teams and diversity of workers (related to finding common ground, mutual knowledge, socio-cultural distance, work culture) (Morrison-Smith & Ruiz, 2020). Gao et al. (2016) stressed the importance of IC, social capital and network characteristics on knowledge collaboration performance, such as network density, connection strength, collaborative atmosphere and culture, but also individual collaborative intention and capacity.

Leadership

The relation between leadership functions and forms, and technology has been examined from four perspectives by Larson and DeChurch (2020), namely technology as context, technology as sociomaterial, technology as creation medium, and technology as teammate. Consequently the authors have identified several implications for leadership, such as the need to compensate for a deficit in affective and cognitive dimensions; shaping technology practices, where human oversight is prominent. Based on the fact that technologies supporting VTs allow for more fluid structures, membership and non-formal leadership, the authors posited that shared leadership may work better in VTs. Distributed leadership in VTs is seemingly a matter of large consensus in the academic literature, justified by their dynamic, collaborative and dispersed nature.

Various studies confirm the importance of relational, human and structural capital in the VTs' effectiveness. In a 2007 study, Malhotra, Majchrzak and Rosen recognized among the effective leadership practices in VTs increasing empowerment and visibility of team members, building trust through communication enabled by ICT, appropriately managing diversity, managing the virtual work cycle, and monitoring team progress with technology support. Recent works underline current themes in VTs' leadership, e.g. e-Leadership dedicated to well-being, to enhancing engagement, trust and relationships, and for encouraging creative performance and innovation (Chamakiotis, Panteli, & Davison,

2021). In the wake of the Covid-19 pandemic, researchers have also stressed the role of team level leadership, communication, flexibility and supportive mechanisms for VT performance in crisis situations (Kilcullen, Feitosa, & Salas, 2021), as well the importance of explaining the new reality, sustaining the corporate culture and trustworthiness, upgrading communication practices and techniques, encouraging shared leadership, performing periodical alignment audits (Newman & Ford, 2021).

The distinction between task oriented (defining roles, responsibilities, objectives, monitoring) vs. relationship-oriented leadership (focus on relationships with team members and well-being) has been analyzed by Batirlik, Gencer and Akkucuk (2022) through focus group interviews. The results showed that the most recurrent topics inside the three VTs were authoritative leadership, quality of knowledge, team size, and personal well-being. Bizilj, Boštjančič and Sočan (2021) have found a higher statistical significance of the leaders' self-perception in carrying out their functions, than the employees' perception, and proposed that the leaders' previous experience in virtual leadership impacts the team members' perception of their effectiveness. At the same time, e-leadership is influenced by the digital communication skills.

Having conducted interviews within a global corporation Van Zyl and Hofmeyr (2021) have revealed how inclusive leadership styles (participative, empowering and non-formal) and the quality of exchanges between team members influence connectedness through common goal orientation, providing partnership for team members' development, building trust, facilitating participation, coordinating, while team members affect connectedness through trust, respect, commonality, frequent exchanges, and engagement. Their results suggest that less formal and frequent exchanges increase pragmatism by encouraging ongoing conversation and increase connectedness by building relationships and reducing perceived distance.

Trust

The topic of trust in VTs has been extensively covered in the inter-disciplinary academic literature as a crucial condition for team effectiveness and performance, as well as a quintessential factor for knowledge sharing (Jarvenpaa & Leidner, 1999; Pinjani & Palvia, 2013; Alsharo, Gregg, & Ramirez, 2017). Research has pinpointed the inextricable link between trust and informal exchanges between team members, which are nurtured by and affect the human and relational capital. Nemiro (2016) identified connection as one of the most important factors for creativity in VTs. Further on, connection is composed of task connection, expressed through commitment and goal clarity, and interpersonal connection, which comprises information sharing, personal bond and trust. Lippert and Dulewicz (2018) investigated the relationship between trustworthiness and global VT performance in a study with a highly significant model fit - which explained 75.7 per cent of the variance - that trustworthiness is an essential factor**,** accompanied by interpersonal communication, commitment and cross-cultural communication style. The relationship between knowledge sharing and trust has been confirmed by Alsharo et al. (2017), however, the authors found that, while trust positively influences VT collaboration, it does not have a significant direct effect on team effectiveness.

Trust and tacit knowledge sharing are grounded on professional familiarity, which is based on information available to team members about the work-related competences and abilities of their co-workers. While this characteristic was found to positively influence information elaboration and subsequently team performance, personal familiarity was not. The latter describes the team members' knowledge about the values, attitudes, beliefs and personal situation of their teammates. Nevertheless, personal familiarity's significance increased in VTs (Maynard & Gilson, 2021). From a different perspective, Flavian, Guinalíu and Jordan (2022) examined the leaders' traits impact on trust and established that, while the leader's gender does not affect trust in VTs, the leader's personality (extroversion vs. neuroticism) does.

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While mapping "the geography of trust", Javidana and Zaheerb (2021) revealed that trust is seen as an essential value by all participants in global teams. Despite this though, how trust is assessed in a diverse team depends mainly on the cultural background and additional individual factors. Social and effective communication, trustworthy behaviors, coping with technical uncertainty and positive leadership have been found to enhance trust in VTs (Alsharo et al., 2017). Furthermore, leaders can encourage trust through both affective (inclusiveness, commitment, collaboration) and cognitive means (common goals, clear roles, boundaries and norms) (Dinh, Reyes, Kayga, Lindgren, Feitosa, & Salas, 2021).

Communication

Communication is another topic of interest in VTs, as it is directly linked to trust, knowledge sharing, organizational culture and performance (Jarvenpaa & Leidner, 1999; Alsharo et al., 2017) and effective communication is one of the challenges associated with virtuality (Morrison-Smith & Ruiz, 2020). In the context of worker switching from office work to VTs during the Covid-19 pandemic, Vătămănescu, Dinu, Stratone, Stăneiu, and Vintilă (2022) have established within an empirical research a strong connection between communication and team culture, as well as team performance in VTs, which in turn is conducive to satisfaction with team work. At the same time, confirming pre-pandemic expectations, Brucks and Levay (2022) have undertaken both a laboratory study and a field experiment concerning the impact of communication media on creative collaboration in VTs from several countries, and established that videoconferencing inhibits the production of creative ideas. The authors posit that idea generation is impeded, as the cognitive focus is reduced by the communicators' focus on the screen. Additionally, it has been found that conversation coordination is also hampered by online media, as speakers cannot make eye-contact. Nevertheless, no differences have been confirmed between face-to-face and VT communication in other contexts.

Performance

Recent studies have focused on the VT performance, confirming that performance is positively impacted by task- and relationship-oriented leadership (Bartsch, Weber, Büttgen, & Huber, 2021). Behavioral cultural intelligence (verbal and non-verbal actions) significantly influences team effectiveness analysed through the communication, performance, role clarity, collaboration and trust dimensions (Mangla, 2021). Maurer, Bach and Oertel (2022) have also stressed that team cohesion and identification with the team, as well as flat hierarchies and self-managing processes positively influence VT performance.

In a highly insightful research that used quantitative analysis supplemented by qualitative analysis of the UK NHS' work during the Covid-19 pandemic, Hargreaves, Clarke and Lester (2022) have established that VT performance affects and is affected by knowledge sharing (facilitated by digital tools), leadership, trust, technology acceptance, social capital and communication. The authors have confirmed that technology acceptance is higher when team members perceive digital tools as easy to use and useful. Nevertheless, access to information might be precluded for employees that were not involved in the VT meeting, if the information is not documented/stored and therefore the method of sharing is relevant.

Despite being initially apprehensive, most of the staff quickly adopted the digital application as a reliable and convenient way for knowledge sharing. Technology was quickly embraced and embedded in the team's culture. The e-leadership was accepted as necessary during the public health crisis. The vast majority of the staff did not perceive the use of digital tools as impeding communication, while others (cca.1/3) indicated a preference for face-to-face interaction. In what concerned social capital and trust aspects, 1 in 5 respondents found it more difficult to speak up in virtual meetings or to read the audience. Interestingly, once again most people agreed that access to senior staff was easier during the VT meetings, and the meetings were more efficient and productive.

Results indicate that introverted, shy people or individuals with less technical skills may be reluctant to speak up or may require training in using the technology.

Well-being

Chumg, Cooke, Fry and Hung (2015) have stated that the employees' well-being plays a crucial role in VTs for sharing both tacit and explicit knowledge, and it is dependent on the social capital development. Chaudhary, Rohtagi, Singh and Arora (2022) have found that three core e-competencies of leaders (e-communication skills, e-change management skills and e-technological skills) impact the employees' wellbeing during the COVID-19 pandemic. Also, emotional intelligence significantly moderates the association of leader's e-competencies and the wellbeing of employees.

There is a considerable number of papers discussing well-being related aspects in VTs, as the Covid-19 pandemic restrictions added to the previously identified issues (Morrison-Smith & Ruiz, 2020; Mangla, 2021; Murphy, 2021; Chaudhary et al., 2022). Soga, Bolade-Ogunfodun, Mariani, Nasr and Laker (2022) have exposed, following a systematic literature review the flexible working practices' (remote work, spatiotemporal work, on-demand and self-directed) possible downsides, namely impacts concerning well-being, family, gender, social profile, boundaries, technology, finances, business, power, leadership, and workplace. In addition to factors specific to VT membership such as dispersion (location/time/culture/language-wise), solitary work, communication and collaboration challenges, prolonged worktime, performance related issues, job insecurity, uncertainty due to COVID-19 may negatively impact employees' psychological well-being (Chai & Park, 2022). Murphy (2021) has envisaged that female employees will suffer the most because of the flexible work arrangements availability, e.g. by switching the balance work-family life and due to employment gaps that could hinder their career development. Another category that could be affected is the younger professionals, as they do not have the work experience to be completely self-reliant and it could prove more difficult for them to get promotions. Additionally, as businesses will start cutting office-related costs, they might be reducing payment for employees also, or cutting health and safety benefits. In Facebook' s case, for example, employees previously got compensations for moving to expensive areas near its HQs, while in case of remote work payment has been decreased.

Qin, Yam, Chen, Li and Dong (2021) posited that talking about the COVID-19 pandemic with VT members hurts teams by decreasing team creativity. A different view has been taken by Redlbacher and Hattke (2022) as the authors confirmed through their research that digital meetings have peculiar characteristics, acting as process constraints, which inadvertently facilitates creative collaboration and consequently stimulate innovation. Moreover, Golden (2021) advanced the view that when it comes to the work-family roles, workers could have either a segmentation or integration preference, by the way they separate or combine the two roles. Tactics for establishing work-family boundaries in teleworking can cover physical, behavioral, temporal or communication dimensions e.g. maintaining a separate workspace, where possible; using technology creatively, separating communication lines and logging off after work hours; establishing work/family separation routines and scheduling activities correspondingly; setting expectations with office personnel and family members about availability and preventing interferences; etc.

Knowledge management in virtual teams

Knowledge management challenges in VTs may revolve around sharing tacit knowledge, as not all members may feel incentivized to participate in it (Kauppila, Rajala, & Jyrama, 2011). A case study showed that the company benefited from creating VTs for knowledge sharing, but the knowledge flow did not work both ways for certain categories of employees. Unlike the knowledge activists that got recognition and did not require supplementary monetary rewards, other employees might have perceived knowledge possession as power and could have been better stimulated through tangible rewards to

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share it. According to Davidaviciene, Al Majzoub and Meidute-Kavaliauskiene (2020) empirical results showed that several factors have a direct effect on knowledge sharing in VTs in the UAE IT industry, namely culture, motivation, conflict, ICT, trust, and leadership. Pinjani and Palvia (2013) suggested a positive association between knowledge sharing in GVTs and trust, while task interdependence and collaborative technology moderates its relationship with deep-level diversity (attitudes, values, preferences) among team members.

Older studies have repeatedly stressed that ICTs are more adequate to support exchanges of explicit knowledge, but are deficient in conveying tacit knowledge, which provides context and insights through narratives, emotions and intuition (Paul, 2006). Despite this, the author exemplified an effective use of technology in collaborative healthcare activities, which linked explicit and tacit knowledge, by facilitating knowledge creation, discovery and transfer for the benefit of patients. The impact of inadequate or insufficient tacit knowledge sharing has been indicated as a major risk by Reed and Knight (2010), but this is not dependent on geographical dispersion. Such issues might be involved in the results obtained by Hung, Cheng, Hou and Chen (2021), who found that industrial classification (high vs. low-tech) moderates the relationship between cognitive proximity (the extent to which knowledge is shared) and knowledge absorption, as well as between institutional proximity and knowledge contribution in high-tech sector VTs, where competition is high.

Vorakulpipat et al. (2010) stressed the value of IC and especially social capital for knowledge creation in VTs. Nevertheless, confidentiality and intellectual property rights were invoked as an impediment for knowledge sharing. Cao, Xu, Liang and Chaudhry (2012) have confirmed similar findings in respect of the transferring of tacit knowledge in e-business VTs of Chinese enterprises. The team task and job engagement have a positive influence on the effect of knowledge transfer and plays a partial intermediary role in the tacit knowledge transfer process.

The sudden shift to virtual or hybrid working structures in the Covid-19 pandemic context may impact the social nature of (informal) learning at work, as the tacit knowledge sharing plays an important role to this end (Zajac, Randall, & Holladay, 2021). The authors recommend as counter-measures: creating opportunities for spontaneous connection e.g. virtual coffee breaks; ensuring virtual mentoring and knowledge sharing forms; increasing access to online development opportunities; capturing lessons learned through debriefs. Cheng, Kolbe, Grant, Eller, Hales, Symon, Griswold and Eppich (2020) have underlined the importance of creating virtual psychological safety and social presence in teams, by using inclusiveness, validation, normalization and sharing personal experiences to facilitate familiarity, and keeping group size limited. Leading by example is very helpful, and the executives should make use of appropriate mechanisms and tools (e.g. emails, podcasts, social media) to reach and engage the employees no matter their location.

Best practices

Gibson and Grushina (2021) proposed that strategies to augment effectiveness in global VTs include formalization of objectives and structure, establishing identity, reaching across cultural differences, conflict resolution, instituting technology repertoires and sustaining vitality. Krehl and Büttgen (2022) have revealed that managerial collaborative problem-solving practices, relational and empowering leadership, enhanced communication and building a culture of trust were effective practices in a crisis situation induced by the Covid-19 pandemic. According to Whillans, Perlow and Turek (2021) team work requires core activities i.e. task, process, and relationship interactions that need adjustments to ensure effectiveness in the virtual (vs. collocated) environment. In this respect, task-related interactions can be enhanced by: using asynchronous technologies with IM functions to provide feedback and engage in informal exchanges; preparedness and reflection on the meeting's topics; higher engagement through videoconferencing; more relaxed communication rules; more frequent process-related interactions to avoid tedious and time consuming activities. Relationship-related interactions should focus on

increased connectedness; augmented emotional cohesion; scheduling dedicated virtual meetings for informal exchanges, to allow people to catch up on significance of events.

Among the companies committed to workplace flexibility even before the pandemic, Spotify has permanently extended to its employees the *Work From Anywhere Program* since the beginning of the Covid-19 pandemic and this has become a strategic choice for the future of work within the company (Spotify, 2021). Staff can choose their work location (depending on the applicable regulations) and work mode (in office, at home, or hybrid). The employer ensures that workers are endowed with the necessary technological equipment and have access to the company's virtual resources. In addition, Spotify extends the organizational culture into the virtual realm and creates virtual events that attend to its community cultural diversity. The organizational culture is supplemented with the *Heart & Soul* mental health initiative, launched in 2018, to promote a culture of awareness, acceptance and sensitivity within the organization (Spotify, 2018). Meanwhile more businesses have stated embracing full work flexibility e.g. SAP (*Pledge to Flex*), Twitter, 3M, etc.

Microsoft has also perceived the strategic business opportunity of hybrid work, pushed forward by the pandemic, but also in line with the wish for more work flexibility supported by most of its staff . The company stated in its document "Hybrid Work: A Guide for Business Leaders" (Microsoft, 2021a) that this work form has become inevitable, and business should be prepared for enhanced digitization and overall switch to the cloud, work flexibility (site, location, time), extended usage of digital tools for collaboration, learning and well-being, while combating digital exhaustion from the top, with the view to enhance the talent acquisition and retention. Microsoft's 2021 "The New Future of Work Report" (Microsoft, 2021b) has also stressed certain challenges that business faced in relation to the work restrictions imposed during the Covid-19 pandemic and the switch to virtual team working. Specifically, the creative work and the decision-making processes have been particularly affected, not only by the virtual media limits, but also due to reliance on short-term data availability. Additionally, the informal exchanges between people had suffered, while they took to "parallel chat" during meetings. The managers' and leaders' roles have become paramount not only for the business continuity and work performance, but also for the employees' well-being, as data showed that prioritization of tasks and projects, clear input and monitoring, increased feedback, maintaining morale and engagement has helped productivity, as well as physical and mental welfare. While working from home has had certain benefits such as flexibility, it has affected the professional/personal life balance and the psychological well-being for many, but has shed a light on structural inequalities in the workforce, too. Despite such challenges, people have found alternative work practices that will endure in the future in hybrid work models. Furthermore, the digital platforms allowed for development of new connections. A summary of the findings can be found in Table 1 below.

Table 1. Summary of findings

Topic	Article	Method	Findings
ICM in VTs	Capece and Costa (2009)	Qualitative; theoretical model	Propose an evaluation method to measure IC impact on knowledge creation in VTs
	Vorakulpipat, Rezgui and Hopfe (2010)	Qualitative	Value of IC & social capital in knowledge creation in VTs
	Sarker, Sarker, Kirkeby and Chakraborty (2011)	Quantitative theoretical model	The role of outstanding team members and social networks in decision making in GVTs
	Disanayake, Zhang and Gu (2015)	Quantitative	IC & social capital influence on team performance in VTs
	Gao, Guo, Chen and Li (2016)	Quantitative	IC & social capital derived in team networks impact knowledge collaboration in VTS

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	Van Zyl and Hofmeyr (2021)	Qualitative	Connectedness, leadership approach and quality of exchanges among team members affect performance in dispersed teams
	Radonić, Vukmirović and Milosavljević (2021)	Quantitative	Positive effect of hybrid working on IC
VTs functioning: framework	Maznevski and Chudoba (2000)	Theoretical; qualitative	Theoretical framework for GVTs functioning
	Morley, Cormican and Folan (2015)	Qualitative	Advantages and disadvantages of VT working
	Isaac, Herremans and Nazari (2017)	Qualitative	Structures, characteristics and dynamics of a virtual company
	Abarca, Palos-Sanchez and Rus-Arias (2020)	SLR	Main themes in the VT literature
	Handke, Klonek, Parker and Kauffeld (2020)	LR	Work design in VTs
	Morrison-Smith and Ruiz, (2020)	SLR	Challenges in VTs
	Chamakiotis, Panteli and Davison (2021)	LR	E-leadership in VTs
VTs & leadership	Malhotra, Majchrzak and Rosen (2007)	Qualitative	Effective leadership practices in VTs
	Larson and DeChurch (2020)	LR	Relationship between technology and leadership in VTs
	Kilcullen, Feitosa and Salas (2021)	LR	Leadership practices to quickly adapt to the Covid-19 pandemic crisis
	Newman and Ford (2021)	Theoretical	Leadership approaches for aligning organizations to requirements of virtual work during Covid-19 pandemic
	Bizilj, Boštjančič and Sočan (2021)	Quantitative	Virtual leadership efficacy during Covid-19 pandemic
	Batirlik, Gencer and Akkucuk (2022)	Qualitative	GVTs leadership styles in MNCs
VTs & trust	Jarvenpaa and Leidner (1999)	Qualitative; Quantitative	Role of trust and communication in GVTs
	Pinjani and Palvia (2013)	Quantitative	Trust impact on knowledge sharing in GVTs
	Nemiro (2016)	Qualitative	Connection affects creativity in VTS
	Alsharo, Gregg and Ramirez (2017)	Quantitative	Trust influences knowledge sharing
	Lippert and Dulewicz (2018)	Quantitative	Trustworthiness has a significant effect on GVTs performance
	Maynard and Gilson (2021)	Qualitative	Professional familiarity influences trust and VT performance
	Javidana and Zaheerb (2021)	Qualitative	Trust depends on cultural background and experience
	Dinh, Reyes, Kayga, Lindgren, Feitosa and Salas (2021).	Qualitative	Leaders can build affective and cognitive trust
	Flavian, Guinalíu and Jordan (2022)	Quantitative	Leader's personality affects trust in VTs
VTs & communica-tion	Jarvenpaa and Leidner (1999)	Qualitative; Quantitative	Role of trust and communication in GVTs
	Vătămănescu, Dinu, Stratone, Stăneiu and Vintilă (2022)	Quantitative	Communication affects team culture, as well as performance in VTs, which leads to satisfaction with team work
	Brucks and Levay (2022)	Laboratory study	Videoconferencing impedes creativity

VTs & performance	Bartsch, Weber, Büttgen and Huber (2021)	Quantitative	Task- and relationship-oriented leadership affects VT performance
	Mangla (2021)	Quantitative	Behavioural cultural intelligence significantly impacts VT effectiveness
	Maurer, Bach and Oertel (2022)	Qualitative; quantitative	Team cohesion positively affects team performance
	Hargreaves, Clarke and Lester (2022)	Quantitative; qualitative	VT performance influences and is influenced by knowledge sharing (facilitated by digital tools), leadership, trust, technology acceptance, social capital and communication
VTs & well-being	Chumg, Cooke, Fry and Hung (2015)	Quantitative	Employee well-being is related to social capital development in VTs and plays an important role in knowledge sharing
	Murphy (2021)	Theoretical	Workplace-related benefit cuts could negatively affect staff; women- and young employees could bear the negative impact of flexible working arrangements
	Golden (2021)	Theoretical	Tactics to ensure work-family boundaries; employee preferences determine segmentation or integration of the two roles
	Qin, Yam, Chen, Li and Dong (2021)	Quantitative	Covid-19-related discussions negatively affect creativity in VTs
	Chaudhary, Rohtagi, Singh and Arora (2022)	Quantitative	Leaders' e-communication skills, e-change management skills and e-technological skills impact the employees' wellbeing during the Covid-19 pandemic
	Soga, Bolade-Ogunfodun, Mariani, Nasr and Laker (2022)	SLR	Flexible working practices raise numerous well-being related concerns
	Chai and Park (2022)	LR; case studies	Dispersion, isolation, insecurity, uncertainty can affect psychological well-being
	Redlbacher and Hattke (2022)	Qualitative	Digital meetings facilitate collaboration effectiveness and subsequently innovation
KM in VTs	Paul (2006)	Qualitative	ICTs are not apt for tacit knowledge sharing
	Reed and Knight (2010)	Quantitative	Inadequate tacit knowledge sharing is a major risk in VTs
	Kauppila, Rajala and Jyrama (2011)	Qualitative	Tacit knowledge sharing can be a challenge in VTs, if employees do not feel motivated
	Cao, Xu, Liang and Chaudhry (2012)	Quantitative	Competition may impede tacit knowledge sharing in high-tech sectors
	Pinjani and Palvia (2013)	Quantitative	Trust impact on knowledge sharing in GVTs
	Davidaviciene, Al Majzoub and Meidute-Kavaliauskiene (2020)	Quantitative	Knowledge sharing in the IT industry is impacted by various factors
	Cheng, Kolbe, Grant, Eller, Hales, Symon, Griswold and Eppich (2020)	Qualitative	Importance of psychological safety and social presence in VTs

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	Hung, Cheng, Hou and Chen (2021)	Quantitative	Knowledge sharing and contribution, as well as knowledge absorption are impacted in high-tech sector VTs where competition is high
	Zajac, Randall and Holladay (2021)	Theoretical	Tactics to enhance informal exchanges in VTs
VTs best practices	Whilans, Perlow and Turek (2021)	Qualitative	Tactics to improve task-, process- and relationship-related interactions
	Gibson and Grushina (2021)	Qualitative; quantitative	Strategies to increase VT effectiveness
	Krehl and Büttgen (2022)	Qualitative	Effective e-leadership practices

Source: Authors' own analysis

Conclusions

The literature concerning the impact of IC management on VTs is minimal, unlike the investigation of the role of IC in traditional organizations, as revealed by this study, despite the boom in the use of VTs recently. Nevertheless, there is an upward trend, based on the unveiling of the newest research published by the academia in the aftermath of the Covid-19 pandemic, event which had the unintended effect of exponentially extending the use of flexible work arrangements in the virtual environment.

Though some IC components have made the object of research in a multitude of papers on VTs, as shown here, researchers are still to analyze their significance through the lens of the intellectual capital-based view and its grounding theory.

From a theoretical point of view this study aimed to reveal and fill in a research gap, while stressing the need for sustained efforts to enrich the IC field with new knowledge avenues in harmony with the most recent business, economic and societal trends. From a practical perspective, the paper attempted to offer to the managers a review of the latest investigations and best practices in respect of work in VTs and the role of IC in adding value to organizations.

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