GLOBAL LEADERSHIP COMPENTENCES FOR THE FUTURE

VIRTUAL COLLABORATION

Professor Jakob Lauring
Department of Business Administration
Aarhus University

Assistant Professor Anders Klitmøller
Department of Language and Communication
University of Southern Denmark

GLOBAL
LEADERSHIP
ACADEMY

AARHUS
UNIVERSITY

EXECUTIVE SUMMARY

The amount of virtual collaboration in international firms is growing by the minute, yet very little research on global virtual work has been conducted – in particular in a Danish organizational context. Thus, the purpose of this study was to understand how temporal dispersion, cultural/linguistic differences, technological challenges, and virtual leadership would impact global virtual collaboration. The results build upon 110 qualitative interviews and observations in three international organizations, as well as quantitative data from three separate surveys in different Danish owned international organizations. In total, we received responses from 1376 individual virtual employees in seven large companies. In the following we outline the steps that Danish managers can take to address the identified challenges.

In order to address collaborative challenges related to temporal dispersion, Danish global virtual leaders should create clear guidelines concerning what they perceive to be a proper response time in virtual work. Also the leader should ensure that the "sense of isolation" caused by time-zone differences is reduced – for example by involving foreign team members in virtual meetings. Furthermore, team members' input concerning when and how much they can participate beyond working hours should be taken into consideration. Otherwise it might impact work-life balance and thereby motivation negatively. Finally, it is important that the leader aligns virtual norms in the team as this increases satisfaction and performance.

We found cultural differences to influence communication styles and thus negatively affect virtual team effectiveness. Cultural differences between team members can be addressed by implementing cultural awareness training that focuses on how culture affects media use. Cultural differences are particularly outspoken in e-mail communication. Linguistic challenges, on the other hand, are more prevalent in telephone conversations due to differences in accent and verbal vocabulary. The latter issue can be addressed by increasing awareness of the relation between language differences and media use and by implementing language training. In relation to this, global virtual teams who consistently use English are more satisfied compared to teams that do not. Additionally, the virtual leader should be aware that the virtual environment amplifies national differences between team members. This highlights the necessity for recruiting members with strong cultural awareness/intelligence as this is positively correlated with performance and satisfaction. However, the leader should be aware that cultural intelligence may work differently in a virtual team compared to a co-located setting as our results show.

Technological issues were found to present great challenges. In order to address these issues, organizations can invest in a strong technological infrastructure as internet breakdown has substantial negative impact on virtual collaboration. Furthermore, the leader should limit the number of participants in virtual meetings and address them personally to ensure input from each member. Thereby, the leader avoids dissatisfaction and conflict in the team. Also, policies concerning response time, i.e. time that an individual has to reply to an e-mail, and the circumstances under which members are allowed to copy in superiors, should be implemented. If not, work will be delayed and leaders at the upper organizational levels experience information overload. This, however, does not mean that leaders should discourage the use of e-mail since this medium actually has a positive impact on team members' satisfaction compared to other communication technologies.

We found further that virtual leaders should try to create global "presence". This can be achieved with a leadership style emphasizing strong task knowledge, establishing clear targets and goals, and ensuring face-to-face meetings during a project's lifetime. Also the global virtual environment necessitates a flexible and proactive leadership style in order to accommodate the diverse backgrounds of the members. In addition, the leader should implement clear procedures for virtual support, communicate clear goals, and focus on the virtual aspect of working. Finally, the most important skills that global virtual leaders must possess according to virtual team members are being open-minded, patient, and culturally aware.

TABLE OF CONTENTS

INTRODUCTION

Globalization has made international companies' ability to coordinate activities spanning across vast geographical distances increasingly important. In consequence, Danish organizations rely ever more on virtual teams to facilitate collaboration between dispersed units. The positive aspects of virtual collaboration include allowing the organization to tap into geographical distributed talent pools. Moreover, technology mediated communication offers a more cost effective and sustainable alternative to face-to-face collaboration. However, negative aspects related to crossing cultural, linguistic, and temporal boundaries when using technical communication media also exist (see table below).

Despite the fact that virtual teams are part of everyday life in any major organization, it is still a relatively novel research area, and Danish leaders report that they often feel challenged by the virtual environment. Thus, the aim with this report is to explore how challenges, as identified by global virtual team members and leaders, affect collaboration in virtual teams.

In particular, the report focus on four key characteristics of global virtual work, i.e. 1) temporal dispersion, 2) cultural/linguistic differences, 3) technological limitations, and 4) lack of the global leaders' physical presence.

Table 0a: Possibilities and challenges related to global virtual collaboration	
ADVANTAGES	**POTENTIAL DISADVANTAGES**
Cost-reductive alternative to face-to-face collaboration	Time-zone differences between virtual team members
Sustainable alternative to face-face-to-face collaboration	Cultural/linguistic differences between virtual team members
Virtual collaboration allows the organization to tap into geographically distributed talent pools	Technological limitations
Virtual teams are more focused on the task compared to face-to-face teams	Lack of global leadership presence

RESEARCH PROJECT

The project 'Global Leadership Competences for the Future' is a joint venture between DI – the Confederation of Danish Industry, Copenhagen Business School, and internationally operating Danish companies. The project is sponsored by The Danish Industry Foundation and is scheduled to end in 2015. The purpose of the project is to *identify, develop, and contribute to the implementation of* global leadership competences in Danish corporations. The project is a mix of producing new knowledge and designing

workshops, seminars, communication activities, and training programs. "New" knowledge is developed by Industrial PhD's and through research activities, e.g. carried out by the International Management Team located at Department of Business Administration, Aarhus University, and Department of Language and Communication, University of Southern Denmark. The present research activity focuses on "Virtual collaboration".

DATA

DATA COLLECTION

The results presented in this report build on both qualitative and quantitative data. The qualitative data stem from three international organizations, which have been obtained using a range of different data gathering techniques. Thus, 110 semi-structured interviews were conducted with virtual team members and team leaders. In order to gain an understanding of the global challenges in virtual collaboration, we ensured that members collaborated across vast geographical and temporal distances. Thus, interviewees where located in the following countries: Denmark, India, China, Spain, Germany, Sweden, Norway, Portugal, Hungary, USA, and Finland. Each interview consisted of a fixed set of questions related to the four themes of the report; 1) temporal dispersion, 2) cultural/linguistic differences, 3) technological limitations, and 4) lack of the global leaders' physical presence. However, the interviewers also allowed informants to bring up new topics to gain a broader understanding of leadership challenges related to virtual work. The researchers also carried out observations in the three organizations. Observations were carried out during lunch and social gatherings where issues relating to virtual teams where often discussed informally. Observations were also conducted in the offices where virtual team members worked, and researchers also participated in formal virtual meetings. Observations were carried out in Denmark, India, Spain, Finland, and USA.

In addition to the extensive qualitative studies, three separate questionnaires were distributed using responses from 1382 employees located in 7 Danish owned international organizations.

Survey I was send to 981 virtual workers from 6 different Danish owned international companies. Eventually, we received 676 responses amounting to a response rate of 69 percent. The average age of respondents was 41.4 years and the average tenure was 11.2 years. 68 percent of the respondents were male and 74 percent of the respondents came from Denmark. Non-Danish employees represented 51 different nationalities. Of the non-Danish respondents 50 percent came from outside the EU. The average percentage of non-Danish employees in respondents' departments was 25.4. This is equivalent to

responses in our collected sample. The average number of languages spoken on a daily basis in the departments was 2.4.

Survey II is based on responses from 399 employees in virtual teams located in Denmark and India from one large Danish corporation. The response rate was 81 percent. 89 responses came from India and 310 responses came from Denmark. Among individuals employed in Denmark 16 percent were of non-Danish nationality. 73 percent of respondents were males and 22 percent of respondents had managerial obligations.

Survey III was send to 304 virtual team members located in different international subsidiaries of one large Danish MNC. 261 individuals from 30 virtual teams responded. The survey questions contained both open-ended and close-ended questions. The vast majority of respondents are males (84 percent). The biggest group consisted of employees born in Denmark (58 percent). Chinese-born employees accounted for approximately 13 percent of the respondents. Other well-represented nationalities included American, Hungarian, and German-born employees.

DATA ANALYSIS

The transcribed data set from the qualitative survey was imported into Nvivo9®. The coding scheme was developed deductively from the interview grid, and inductively from the answers of the participants. Codes were then combined into higher-order codes so as to create aggregated categories. These aggregated categories were then assembled under main themes in order to organize the write-up of the results. The main themes derived from the interview material are quoted in this report to illustrate our analyses.

Quantitative data was analyzed using hierarchical regression and ANCOVA/MANCOVA. We also use descriptive statistics in tables as illustrations. These can be found in the Appendix.

RESEARCH RESULTS

In the following we present the results of the survey. The report is divided in to four main themes: 1) Temporal differences, 2) Cultural/linguistic differences, 3) Technological challenges, and 4) Leading through global presence. Under each theme the qualitative and quantitative data are presented followed by a presentation of leadership responses to the identified challenges.

THEME 1: LEADING TEMPORAL DIFFERENCES

QUALITATIVE RESULTS RELATED TO TIME-ZONE DIFFERENCES

In the qualitative data, global virtual team members would highlight a positive aspect of time-zone differences in virtual work. It would be argued that temporal dispersion allowed for a "follow the sun" principle where the task was solved in accordance with time-zone differences. For example, if an employee in Denmark had to finish a PowerPoint presentation he could send it to India in the evening and receive it the morning after. While some individuals could see an advantage of temporal dispersion, most individuals would hold the opinion that time-zone differences had a negative impact on collaboration in the teams. For example, it would prove difficult for the virtual team members "to find each other" when the task necessitated a discussion between the members. As expressed by this Indian virtual team member working primarily with Danes: *"Time [difference] is also a part of it. I cannot contact them [the Danes] when I am working on something during their night."* The results of the qualitative studies also suggest that communication challenges between team members would increase exponentially with time zone differences. Thus, it would prove more and more difficult for the virtual team members to find overlapping working hours. As noted by this Danish virtual team member: *"Work time really shrinks as more time zones are crossed and it is almost non-existing each time we have to include China."* Another informant elaborated on this point:

> *"With a time zone difference of 9 hours between California and Denmark, the window of opportunity for contacting each other is very limited, and don´t underestimate this! There is practically no overlap in working hours"* (Global virtual leader, US).

Thus, the lack of joint working hours delays communication. This, in turn, causes great frustration since the individual members of the team are not able to proceed with a given task:

> *"You easily lose a day or two […] this is really a frustrating barrier when you just want to go on with your project. When you are at a distance it is not good enough to be able to schedule a meeting in two days, sometimes you just have to be able to sit down and talk to people here and now"* (Global virtual leader, Denmark).

Even routine tasks such as scheduling a meeting would, according to the informants, become complex and fraught with interpersonal friction. As noted by this Danish virtual team member: "*Then you are struggling just to put up a video or telephone conference with a colleague or your boss … this is really a frustrating challenge.*" In consequence, most communication would take place via e-mail. Yet, team members' shift from telephone/video conference to e-mail is not unproblematic. The lack of telephone and/or web-based communication can leave team members with the feeling of being excluded from important decisions. In particular, informants would feel excluded when the meeting took place at times where they had difficulties attending. One informant said: "*You feel neglected!*" and went on to tell how this happened from time to time: "*We had a really bad example with a workshop where 50 persons had been invited and here in the U.S. we had to get up at. 3.00 in the morning!*" In relation to this a Danish manager residing in the US stated that:

> "*As a Dane you just don´t think of how big this frustration can be… After I have been here I now experience that the time zone difference is a practical burden of being a global part of this company.*"

While a global virtual team manager from the US jokingly listed endurance as one of the most important traits due to conference calls at odd hours, it was not always possible to participate which severely impacted identification with the team:

> "*You see, when Americans feel excluded from meetings and information in general, we become like teenagers. We want to be heard but at the same time we want to be independent. I think we all have our moments of anger and frustration because of this.*"

In relation to leading virtual collaboration that is affected by time zone differences, global managers would highlight the necessity to structure virtual communication more than what would be needed in face-to-face communication:

> "*You have to set up rules for when you answer e-mails and phone calls. You have to do it. I always send e-mails at 6 in the morning, I have told everybody, but I do not expect anyone to answer before 8 o'clock. If you communicate then they know what to expect*" (Global virtual leader, Denmark).

Hence, alignment of virtual norms came up as an important theme in the qualitative interviews. The norms of how to use technology for communication and when to use it seemed to have important consequences for virtual collaboration. In addition to guidelines concerning communication, virtual leaders would also

emphasize the necessity of being flexible and aware of the individual team members' work-life balance. Thus, an informant stated:

> *"When you work with our Japanese customers you have to work a lot of off-set hours. You have to prepare a lot of work for the next morning. But he [the global leader] has also told us to find our own balance and inform him. So rules are flexible. That is ok."*

In sum, the majority of informants would perceive time zone-differences as an obstacle for virtual collaboration. Lack of communication due to limited overlap in working hours would lead to delay of work, a sense of isolation, and problems with work-life balance. The results, however, also suggest that virtual leaders could address these issues by creating clear guidelines based on team members' individual needs, and by ensuring synchronous communication when possible.

QUANTITATIVE RESULTS RELATED TO TIME ZONE DIFFERENCES

In order to further verify our qualitative results in a larger population we took departure in central themes from the interviews and used them in survey research. More specifically, we used survey III to explore the role of time zone adjustment (being well adapted to work across time zones) and alignment of virtual norms (agreement of when and how to use different media). Two scales were developed based on theories in the area. Both scales, 'Time zone adjustment' and 'Alignment of virtual norms', had good psychometric properties (alfa > .7).

First, in relation to a number of factors we explored who would have more difficulties adjusting to time zone differences and who would see virtual norms as best aligned in the virtual team. With regards to adjustment to time zone differences, we found no significant differences in any identifiable groups. However, we did find that individuals who had worked shorter time in the company and younger individuals perceived norms concerning the proper use of virtual media and virtual communication to be significantly more aligned than individuals with longer tenure and older individuals (see table 1b and 1c in Appendix). This is probably related to the fact that younger individuals have fewer established preconceptions about virtual work from earlier experiences. Moreover, younger individuals are probably more used to communicate using different virtual media and have thus developed specific norms for virtual interaction during their adolescence e.g. by using social media. Hence, alignment of norms in relation to virtual work seems to be less of a problem for younger and less experienced individuals than for older employees.

As a second step we explored the effect of 'Time zone adjustment' and 'Alignment of virtual norms' on job satisfaction and job performance. Results show a strong significant relation between the alignment of virtual norms and both job satisfaction and job performance (see table 1c in Appendix).

Hence, our quantitative results show that although qualitative results had clarified that time zone differences were a major disturbance for virtual collaboration, being well adjusted to working across times zones did not improve satisfaction or performance significantly. This indicates that one can adapt to working across time zones but this adaption will not increase performance or satisfaction much.

Another central theme in our qualitative research was alignment of virtual norms. This also seems to be an important concept in our quantitative studies. Not only are there significant differences among groups in relations to how they perceive alignment of virtual norms there also seems to be a relatively strong and positive effect on performance and satisfaction if norms of virtual communication are aligned (see table 1c in Appendix).

In sum, the quantitative findings show that global virtual leaders should strive to align virtual norms, and be aware that this can prove particularly problematic when dealing with older and more experienced personnel.

LEADING TIME ZONE DIFFERENCES

Table 1d: Leadership responses to enhance virtual collaboration effectiveness across time zones			
	POSITVE ASPECTS OF TIME ZONE DIFFERENCES	**IDENTIFIED CHALLENGE**	**LEADERSHIP RESPONSE**
QUALITATIVE FINDINGS	Work can 'follow the sun' principle	Lack of communication due to limited work-hour overlap	Structure communication and create guidelines concerning time for response
		Sense of isolation due to lack of 'real-time' interaction	Ensure that communication via telephone and/or internet takes place when possible
		Problems with work-life balance due to attendance in meetings at odd hours	Allow members to give input on when and how long they can participate in meetings outside of working hours
QUANTITATIVE FINDINGS	Global virtual leaders should strive to increase alignment of virtual norms as this has a positive effect on team members' job satisfaction and job performance		
	Global virtual leaders should be more aware of problems related to alignment of virtual norms when dealing with older and more experienced team members as they will see it as a greater problem than younger and inexperienced team members		

According to the qualitative study team members encountered virtual communication challenges because of cultural differences. In particular, informants would highlight differences in relation to communication style. Thus, virtual team members would, for example, hold a different understanding of the degree of detail that was needed to solve a given task. As noted by this Chinese virtual member: *"My boss in China will give me the directions for the project and she will follow my advances. While my boss here in Denmark will not be so detailed about the project and how this is going."* The difference in communication styles, would often lead to miscommunication and conflict:

> *"When Indian employees are using e-mail they will write a long e-mail just to get simple information like the thickness of a plate. The Indian guy thinks the receiver does not know all the details of the project, so he writes a long e-mail. And the Danish guy is missing what is important and gets angry and impatient"* (Virtual team member, Denmark).

The difference in communication styles would often lead to delay of work which would hamper the effectiveness of the virtual team:

> *"After going through the e-mail from Denmark I can see that it does not have enough details, and then I will say - where is the information? - Should I do this or that? Without the particular information we cannot go forward. Then I will start asking for details in the e-mail and then they will have to reply. It takes a lot of time, and the Danes will get angry with us"* (Virtual team leader, India).

Or as conveyed by a team member:

> *"The task often gets complex because it is only for the simplest of tasks we have standards, so if you have to give input to a new product it gets very problematic. Then you have to try to guess what information the Danes need which is impossible. And since it is by e-mail, it can take several days, and you cannot quickly discuss and find a solution"* (Virtual team member, India).

In particular, different perceptions of time and deadlines would cause problems in virtual collaboration between team members with a high degree of cultural difference as for example between Danish and Indian team members. Global virtual team leaders would also report that they did not feel sufficiently equipped to deal with the challenges described above:

"When you give an assignment to a Dane and the outcome is not clear but needs some investigation, the Dane will find out how to do it and will try to do the best. A Chinese will ask first: how do I do that? and then answer: I do not have the required information. In these steps there will be some misunderstanding and it will take a couple of weeks before there is feedback. I did not have any training for this" (Global virtual team leader, Denmark).

Some companies would report that they had placed a local liaison in headquarters to overcome virtual communication challenges. For example, one company had an Indian project employee sitting in Denmark to handle the communication with India which had a positive impact on virtual team effectiveness. As such, organizations could use individuals with a high degree of cultural understanding (or high cultural intelligence) as intermediaries between units communicating virtually:

"Overall we have seen a 40 to 50 percent reduction in time. For example, when we get an order on some drawings we have twenty five days to finish them. But sometimes it would take two to three days before the Danes answered, and even then there would be misunderstandings due to the complexity of the task. It would take the time we would have to reach our target and we would cross the deadline by many days. So, in projects where he handles the communication with India and talks face-to-face with Danes it is going well" (Global virtual team leader, India).

In conclusion, cultural differences would impact communication style which in turn would lead to conflict and delay of work. In relation to this, global virtual leaders did not feel sufficiently educated in virtual cross-cultural communication which could add to the challenges mentioned above. Some companies chose to address this by placing a cultural competent liaison to handle the virtual communication.

QUALITATIVE RESULTS RELATED TO LANGUAGE

All informants would argue that language differences and language skills would be important for understanding collaboration challenges in the virtual teams: *"What I really think matters for effective [virtual] collaboration is proficiency in English."* In particular, virtual team members would struggle with variance in accents when speaking over the telephone:

"The challenge is that the Indians speak with this weird accent. It is not so much that we do not know the same words. It has more to do with the fact that they speak in this funny tone making it hard to understand. If we discuss something complex we have to ask again and again, and even then we still misunderstand each other" (Virtual team member, Denmark).

This would lead to frustration and anger among the virtual team members. As noted by this Indian team member who collaborated extensively with Danes: "*Their English understanding and pronunciation is bad and this leads to many misunderstandings - especially when things entail more than everyday stuff*". In line with this perception a Danish informant stated:

> "*Every time I have a phone meeting with members from Spain who don't speak English that well my hands start to get sweaty 10 minutes before. Because, you know, it will just be so god damn awkward because I know we will not be able to understand each other*" (Virtual team member, Denmark).

Therefore, in the majority of virtual teams where substantial language differences could be found there was a preference for using e-mail when communicating internally about complex tasks. As mentioned by an Indian virtual team member:

> "*When I have to solve a complex task with a Danish person, I prefer to write an e-mail because I know they will not understand me because of my accent and vocabulary. Then they can use the dictionary when they read and reply to the e-mail*" (Virtual team member, India).

Thus, according to the informants, the problems encountered on the phone due to language differences could only be solved by using e-mail and not by using e.g. telephone. Video conferencing was sometimes conceived to be less practical as you had to book a room and thereby lacked spontaneity. Furthermore, the nonverbal cultural cues that would be used during the conversations seemed to add to the confusion rather than eliminate it. For example, in video conferences it could be noted that Indian employees would sometimes nod as a sign of respect even when they clearly did not understand what was explained. Moreover, sometimes Indians would shake their head in a characteristic way generally expressing agreement in India. This was often misunderstood as a sign of disagreement.

In sum, language differences, in particular in relation to accents, would lead to miscommunication, frustration, and anger between virtual team members. While such challenges can be addressed by implementing language policies, communication can also be enhanced by relying on e-mail rather than telephone in teams with substantial language differences. Hence, we found that language management and the promotion of openness to language differences was central to virtual collaboration.
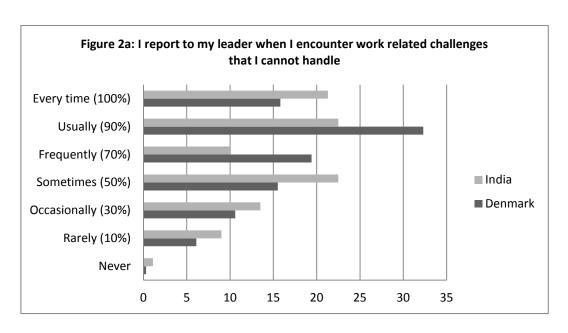
In addition to qualitative research we also conducted surveys in order to further explore the role of language and culture in virtual teams. With regards to culture, we took departure particularly in two central findings from the qualitative research: 1) that cultural differences were often mentioned in relation to virtual practices, and 2) that cultural understanding (cultural intelligence) is beneficial in virtual teams.

First, with regards to cultural differences in relation to working virtually we ran a large number of tests. However, we found much fewer differences between cultural segments than what we would have expected based on the qualitative results. For example, in survey I we compared Danes and non-Danes (51 nationalities) in Denmark with regards to virtuality (how much individuals were in contact with others using virtual media) and mobility (how much individuals were working from different locations) as well as English spoken during the day both professionally and privately. Controlling for tenure and position we found no differences between Danes and non-Danes in terms of how virtual or mobile they were. We had expected that non-Danish employees would be more virtual in their work than Danes. This was based on the idea that due to extended international networks non-Danish employees would more readily use contacts in different countries. Moreover, limited Danish language skills of foreign employees would also point them in the direction of more international and virtual work. However, this was not the case. We did, however, find non-Danish employees to speak significantly more English in their formal and informal communication. In turn, this did not affect the virtuality and mobility of their work (see table 2a in Appendix).

In order to further test cultural differences with regards to virtual work we looked particularly at the relation between Danes and Indians (Survey II) where a large number of differences had been uncovered in our qualitative research. We found that in virtual work, Danes were more likely to report to their supervisor and to their virtual foreign colleagues when they could not complete a task on time then Indians. This might cause discrepancies with the Indian employees of which 46 percent, in comparison to only 18 percent of Danes, have agreed or strongly agreed with the statement that: "It is more important for me to be thorough than being on time." Consequently, there is a clear difference in values and the perception of the importance of time between Danish and Indian virtual workers.

We also found that Indian employees were less likely to report difficulties with meeting deadlines and other work related challenges they could not handle. As visible from Figure 2a, Danes report more frequently to their global virtual leader when they encounter a work related problem they cannot solve.

Figure 2a: I report to my leader when I encounter work related challenges that I cannot handle

India
Denmark

Every time (100%)
Usually (90%)
Frequently (70%)
Sometimes (50%)
Occasionally (30%)
Rarely (10%)
Never

0   5   10   15   20   25   30   35

There is also a significant difference with regards to their relationship with the leader; Indian express for example that recognition from the leader is an important motivational factor.

After looking for cultural differences in relation to virtual work we assessed the role of cultural understanding conceptualized as cultural intelligence (survey III). Here we found that different types of cultural intelligence affected different types of virtual team work outcomes. Cognitive cultural intelligence (knowledge about different cultures) increased satisfaction with working virtually and the performance of the individual. However, motivational cultural intelligence (how much interest one takes in foreign cultures) affected job satisfaction in general and job performance. What is particularly interesting is that behavioral cultural intelligence did not have an effect on any of the work outcome variables. This very clearly expressed a difference from co-located teams where the cultural intelligence concerning how to actually engage in interaction with individuals from other cultures is highly important. This indicates that in virtual teams different types of cultural intelligence are more important compared to co-located teams.

After looking at cultural differences and cultural understanding we turned to the language sub-theme. First, we compared the rating of language skills comparing Danish employees and Indian employees (survey II). Interestingly, we found a very clear picture that both rated their own language skills as good while rating the other party's language skills as relatively poor. From this we can conclude that there is a perception bias when estimating the actions and abilities across boundaries within virtual teams. Differences are generally perceived to be more prominent than they actually are and they are evaluated in a negative light compared to one's own national group.

Also, as in the qualitative research we found that the management of language and the openness towards differences in language had a positive effect on virtual collaboration. However, we explored this further in our quantitative research (survey I). Here we found differences with regards to virtuality and mobility in relation to how individuals perceived language management (how consistent managers use English when managing) and how individuals perceived the openness of language diversity among team members (how tolerant department members are of individuals speaking with different accents and having different proficiency levels). We found that individuals that were more mobile in their work saw employees' openness to language diversity in a more positive light (see table 2e in Appendix). This is an interesting finding that can be explained by Construal-Level Theory. This theory holds that psychological distance (temporal and spatial) between the self and the object of attention (people, organizations, actions) will impact the perceptions of the individual. Thus, the greater the distance between the employee and the organization, the more likely it is that the individual will apply high-level construal to a given phenomenon. Hence, employees will tend to perceive organizational practices in a de-contextualized and abstract manner and focus on the essence and why an action is performed as it is. Also, individuals will base predictions and evaluations on more general trends and a few superordinate goals. Conversely, when actors are close to the object of attention they will tend to apply low-level construal. Their perception will lean towards concrete, contextualized, and incidental features of the object and focus on how an action is performed. In other words, individuals that are physically distant from the organization will not be as condemning of group members' reluctant to work with individuals with insufficient language skills. They will see this from a more objective perspective focusing on the problems it can cause a person if one has to collaborate with someone who has poor language skills. However, the person that is more present in the organization will according to Construal-Level Theory focus less on objective reasons for why some individuals will see it as a problem to work with others who have a low language proficiency level (see table 2c in Appendix).

Finally, we looked at the effect of using English for communication in virtual teams. Here, results clearly show that satisfaction is higher in teams where English is spoken more consistently. When controlling for self-rated English skills, the effect of being in a team with consistent use of the English language becomes positive. The values of the variable expressing if English is consistently used range from 1 to 5 where 5 indicates a team where English is spoken very often and 1 indicates a department where English is rarely used. Satisfaction is increased with approx. 0.191 for each increase in the predictor scale (see table 2e in Appendix).

In sum, based on the quantitative findings concerning culture and language it was found that the virtual environment tends to amplify national differences that exist between virtual teams members in a negative

manner. Furthermore, the data shows that cultural intelligence has a strong impact on performance and that virtual teams who used a common language consistently are more satisfied.

LEADING CULTURAL AND LINGUISTIC DIFFERENCES IN VIRTUAL COLLABORATION

Table 2f : Leading virtual collaboration characterized by cultural and linguistic differences		
QUALITATIVE FINDINGS	**CHALLENGES**	**LEADERSHIP RESPONSE**
	Cultural differences causing virtual communication challenges between the HQ and the subsidiary	Liaison from the subsidiary in the HQ Cultural awareness training Media policies focusing on cultural challenges related to e-mail use
	Linguistic differences causing communication challenges between the HQ and the subsidiary	Language training Media policies focusing on linguistic challenges related to telephone use
QUANTITATIVE FINDINGS	Global virtual leaders should be aware that team members will see differences among national groups as more outspoken than they actually are	
	Global virtual leaders should be aware that team members will see actual differences in a more negative light than they need to	
	When selecting global virtual team leaders and team members it should be taken into consideration that cultural understanding/intelligence is highly positive for performance and satisfaction	
	Global virtual leaders and top managers should be aware that cultural intelligence works differently in virtual teams than in co-located team as the behavioral dimension, which is very important in co-located teams, seems to be without any effect in a virtual context	
	Team members in global teams where the common language (English) is used more consistently are more satisfied	

THEME 3: LEADING TECHNOLOGICAL CHALLENGES

QUALITATIVE RESULTS RELATED TO TELEPHONE AND VIDEO CONFERENCE

Some informants would mention positive aspects of virtual media including the ability to be in real-time contact with the best person for a given task regardless of the individual's geographical location. However, most team members found virtual communication over the telephone as well as videoconferences problematic due to a range of different factors. Especially, members would highlight technical problems to be an obstacle for virtual work. As noted by an informant: *"You have to face many technical issues on a daily basis […] this is really a challenge to virtual communication."* This viewpoint was supported by several informants who would highlight the negative impact that the lack of reliable technology would have on virtual communication:

> *"When we are facilitating a meeting, the worst thing is when technology messes up, it is frustrating not only for the facilitator but for everybody […] I think many virtual meetings are postponed for this reason"* (Virtual team member, Denmark).

Or as mentioned by a colleague:

> *"These web meetings are so damn boring (…) Sometimes there may even be 20 employees participating in the web meeting. The participation of that many participants creates a lot of technical problems and sometimes we just have to give up or we have to turn off the microphones and cameras to get a better connection… this makes really bad meetings!"* (Virtual team member, Denmark).

Informants would also argue that global virtual leaders were not sufficiently aware of the limitations of the media regarding the number of members that could take part in telephone and web meetings. As noted by a Danish virtual team leader, this would negatively impact the communication in the teams:

> *"[…]but the thing is when you are on the phone and you are not seeing each other … what also happens on a phone meeting is that people interrupt each other because you don't know when it's your turn to say something, in a meeting you know when you should shut up, you cannot do that in a phone meeting. And then the creativity process it's like dum dum dum and on the phone there are 4 people talking at the same time and you didn't hear half of it"* (Global virtual leader, Denmark).

A team member conveyed a similar view:

> *"It might sound like a bad excuse, but the technology is such a problem, and often you are not able to have a qualified discussion when you are more than 3 or 5 participants attending a virtual meeting"* (Virtual team member, Denmark).

Thus, informants would argue that managers would not accept the limitations of the media in terms of participants in web-meetings. This would reduce the team member's communicative exchanges:

> *If I'm leading a phone meeting and there are 5 people on the line and there're 2 guys who are saying a lot then I forget about the 3 other ones whereas if I'm sitting in a face to face meeting and the 2 guys are speaking a lot and 3 guys are being silent … because your eyes always go around, you notice them so you're much more inclined to say "Ok, thank you very much for your input, where do you guys stand?" and you don't say that during a phone meeting"* (Global virtual managers).

Also, informants would criticize the global virtual team leaders for trying to solve too complex tasks too quickly. Thus, while some virtual team members would describe virtual meetings as productive, more often than not virtual meetings were perceived as being ineffective:

> *"Often our virtual communication is just a cascade of information. Some of the problems at virtual meetings are that you are pulled in different directions...There is so much going on. It is as if **they** try to squeeze more into the same time...The natural exchange of information is just not happening at our virtual meetings"* (Virtual team member, Denmark).

These challenging aspects of virtual communication could in turn mean that individuals would refrain from communicating with the other virtual team members: "*I am supposed to call my colleagues of the virtual project (…), but instead I ask the one sitting next to me, it is easier to ask the one close to you*".

Thus, the technological limitations of telephone and video conferences would negatively impact effectiveness in virtual teams. In particular, a high number of participants in meetings would lead to technological breakdown and lack of productive communicative exchanges. Thus, a leadership response to address these issues could be to enhance leaders' awareness of the restrictions of the individual media and reduce the number of virtual participants in web and telephone meetings.

According to the informants in the qualitative study there were many challenges related to virtual communication by e-mail. Virtual team members, and in particular global virtual leaders, would often mention an "information overload" where they would be copied in when a small dispute was going on between two virtual team members. Instead of solving it independently, team members would use the cc-function strategically to make a point and/or use it as documentation to be used politically internally in the team and/or the organization:

> "[...]if we talk for example about the use of e-mail for communication, many times you can create let's say an e-mail exchange [...] and copy it to a lot of people [managers], well it happens sometimes when you try to make a point" (Global virtual team leader, Spain).

Or as mentioned by a Danish team leader:

> "[...] e-mail can tend to quickly become political. Eespecially when there are a lot of people copied in on it, it turns into 'cover my ass'. More and more people I find are often doing that ... the other week I had an e-mail dialogue with a colleague and a couple of people copied in and that turned into 'cover my ass'" (Global virtual leader, Denmark).

This behavior would lead some global virtual team members to ignore e-mails where they are copied in. Thus, information overload either in relation to the above mentioned reasons or for example absence from work would lead to e-mails not being read, and thereby having a negative impact on communication:

> "I receive many e-mails a day, so if I have two or three days off, I am out of the office, [...] at meetings somewhere or maybe on vacation or whatever, then I cannot work through all these e-mails afterwards. I would say there are a lot of e-mails that are maybe important, but you don't have the time to do the work" (Virtual team member, Spain).

Yet despite the challenges, e-mail would also have an advantage compared to telephone or video conferences. In particular, the virtual team members highlight that e-mail forces them to reflect more on the message they wanted to convey, thus at times making communication more precise:

> "[...]on the phone I can end up in a situation where I haven't given my idea enough thought before I communicate and then it is misunderstood, whereas if I'm forcing myself to write it down, the message becomes clearer, there is less of a chance of misunderstanding" (Global virtual leader, Denmark).

This enhances, according to the informants, the communication quality as members think more deeply about the topic:

> *"It's about deep thinking. That is where it can go wrong verbally. You talk too fast and you use the wrong words so it wasn't really what you meant. But if you write it down you can make it much clearer what it is that you mean. When the next guy gets that he can do the same. Like 'ok let me sit down and think about this'"* (Global virtual leader, Denmark).

Thus, informants report that communication by e-mail is challenging primarily due to the informant's strategic use of the media in situations with disputes internally in the team. This can lead to information overload of the global leader. A response to this situation could be virtual policies of when team members are allowed to escalate a conflict to the next organizational level, and guidelines concerning the e-mail copy function. Global virtual leaders could also consider taking advantages of the positive aspects of the e-mail as a tool to enhance team member's reflexivity when solving complex tasks.

QUANTITATIVE RESULTS RELATED TO TECHNOLOGICAL CHALLENGES

Inspired by our qualitative findings we also explored technological challenges in our quantitative research. Thus, in survey III we investigated how different technical media affected work outcomes in virtual teams. We asked respondents to list the percentages of time used to communicate via different media. We only found one significant effect between the use of e-mail and the satisfaction with working virtually. Hence, we can conclude that the more individuals use e-mails for interaction the more satisfied they are with working virtually. This is an important finding because certain studies, based on media leanness theory, have argued that telephone is a better media to use than e-mail. In our study we did not find the use of telephone to have any significant effect on work outcome (see table 3a in Appendix). Hence, it seems that e-mail is the preferred media to use compared to telephone in global virtual work.

We also explored which groups of individuals found that they were given suitable opportunities to get acquainted with technology. Our results show that older individuals and individuals with little tenure found that there was less access to training while younger individuals and individuals with more tenure at the workplace found they had the needed access to training (see table 3b and 3c in Appendix). Older individuals are not as well updated with the new technology, and individuals with long tenure in the organization may need less training as they have gradually come to know the technology. This leaves older individuals with little experience at the workplace as a particularly vulnerable group in terms of technology

training. This is an important finding because we also found that the perception of access to technical training is linked to satisfaction with working in a virtual team (see table 3d in Appendix).

In sum, the quantitative results suggest that telephone might not be the optimal media for global virtual work since respondents are significantly more satisfied when using e-mail compared to the telephone. Also global virtual managers should be particularly aware of older inexperienced team members as they often lack technological skills.

LEADING TECHNOLOGICAL LIMITATIONS IN VIRTUAL COLLABORATION

		POSITVE ASPECTS OF THE MEDIA	IDENTIFIED CHALLENGE	LEADERSHIP RESPONSE
QUALITATIVE FINDINGS	COMMUNICATION AND TECHNOLOGICAL LIMITATIONS IN TELEPHONE AND VIDEO-CONFERENCES	Immediate feedback from globally distributed employees	Breakdown of internet and video feed	Invest in technological infrastructure
			Information overload due to too many participants in the virtual meetings	Limit the numbers of participants in virtual meetings compared to face-to-face meetings
			Virtual team members 'zoom' out of telephone and web meetings	Ensure that everybody is participating by addressing them personally
	COMMUNICATION AND TECHNOLOGICAL LIMITATIONS IN E-MAIL	Increased cognitive reflection when communi-cating	Delay of work and lack of immediate feedback	Create virtual policies concerning time for e-mail reply
			Team members starting e-mail 'wars' or erasing all e-mails in cc	Create virtual policies concerning when to escalate communication to the next organizational level
QUANTITATIVE FINDINGS	In global virtual work managers should encourage the use of e-mail as this medium has a positive impact on satisfaction compared to other media			
	In global virtual work managers should be particularly aware of technically marginalized groups such as older and more inexperienced team members			

THEME 4: VIRTUAL LEADERSHIP

QUALITATIVE RESULTS RELATED TO VIRTUAL LEADERSHIP

Global presence through knowledge, tasks, and goals

Employees perceived the presence of the global leader to be an important part of the leadership role. This did not necessarily mean a physical presence, but rather an awareness or knowledge of what was going on in the virtual collaborative process. As noted by a virtual employee: *"Good leadership for me is when my manager knows what is going on in the area where I am working. He does not necessarily have to be there all the time."* In another interview a global leader elaborated on the relation between knowledge and global presence:

> *"Good leadership – one that seems to work – is demonstrated by the presence of the leader. He knows what is going on in the project, not necessarily in the whole project, but at least he knows enough about some parts of the project and that we are going in the right direction"* (Global leader, Denmark).

Thus, if the global leader is aware of what is going on in his/her virtual team, it enhances the employee's positive perception in relation to the presence of the global virtual leader. Conversely, leaders who do not have an understanding of what is going on in the team are negatively evaluated in the sense that he/she is perceived distant, and thereby lack presence in the eyes of the virtual team members:

> *"I consider my manager an example of bad leadership. I feel that he is not an experienced leader, because it is very difficult for him to navigate the daily work or feel what is going on in the daily life. He [seems] far away"* (Virtual team member, Denmark).

In addition, individuals would mention the importance of clear directions concerning tasks and goal fulfillment as means to create presence. Thus, an expectation from the employees was that global leaders ensured that everybody was working in the right direction. Informants would highlight that this was particularly important in virtual teams solving complex tasks:

> *"One important thing is that the person who has specified the task needs to be in front of the people doing the task, otherwise it cannot work. So when things are becoming fussy and none of us have a clear idea of what the problem is and how to solve it, it becomes difficult. So fussy stuff at a long distance is not working"* (Virtual team member, Denmark).

The qualitative findings were substantiated by the quantitative study. Here, it was found that employees engaged in virtual work would be more positive and significantly more satisfied with virtual collaboration

when there existed clear and well established goals. This might be because overall clear goals also translate into clear goals and structuring of the virtual collaboration. Thus, members who indicate that their managers generally allocated sufficient time for leadership of the virtual teams would be significantly more satisfied with virtual collaboration.

Global presence through strong interpersonal relationships

In our qualitative studies it also became apparent that strong interpersonal relations enhance virtual team members' perception of the global leaders' as being present. In a similar vein an informant suggested that global managers should function as a catalyst for creating strong relations between team members. However, the informants were critical towards whether this was possible in virtual environments:

> *"I am not convinced that it works [virtually]. How does a person from another part of the world know what a worker is doing, how the worker performs, or what is the process by which the person functions? I believe that a worker must have a relationship, develop trust, with his manager and I don't see that possible if done virtually"* (Virtual team member, Denmark).

Thus, virtual team members expected from their global virtual managers to develop strong interpersonal relationships. Initial face-to-face collaboration was suggested as a means to help build such a relationship, as it would be difficult to get to know each other via communication technology as noted by this Danish virtual team member: "*It is necessary to establish good communication to and understanding of virtual team members. In the beginning preferably as face-to-face contact.*" This sentiment was supported by an Indian team member: "*E-mail is helpful but then you have to go face to face to build the relationship. If you do not meet, you will not bond.*" Thus, informants would argue that the global managers would feel more present if they had established strong interpersonal relationships before commencing extensive virtual collaboration, and that it would diminish potential misunderstandings and conflicts:

> *"It is really important if you have to work with someone that you have met physically. If the person does not trust you, there is nothing you can do about it when you are 1000 kilometers apart. For example, we had a meeting where somebody came up to me and whispered something unpleasant in my ear during dinner. Because I had the possibility to go ask directly what was going on we could reconcile immediately. Something happens when you are physically together. You might not match each other, but you know where you stand with each other"* (Virtual team member, Denmark).

> *"The challenge in these virtual teams is that you very seldom meet face to face. You always do these things as web or video or teleconferences, but okay, I think it's – you have to decide to a certain extent, even if it costs more and all these things, it really makes sense to meet face to face*

sometimes hear that workshops are conducted by teleconference, and I always think 'hey, at a workshop you really have to stand up and you do this by teleconference'. It's a waste of time and money" (Virtual team member, Denmark).

Global presence through flexibility and proactivity

The empirical data suggests that global leaders do not only need to develop knowledge, clear goals, and strong interpersonal relationships in order to lead virtual teams effectively; virtual leaders also need to diversify their leadership style and strategies in order to meet the individual members of the team. For example, the leader needs to accommodate his/her leadership style to the diverse backgrounds of the team members:

> *"If you give an assignment to a Chinese in the same way that you will do it with a German, Danish, American then I think you are assuming wrong. But it is difficult for every manager to have a bigger understanding of the different cultures and what kind of feedback they expect to get, and what kind of information I need to give them"* (Global leader, Denmark).

As the quote readily illustrates, it was challenging for the leaders to diversify their leadership approach. Thus, a lack in flexibility and awareness of individual differences can have the consequence that team members suffer in silence as illustrated in the quote below:

> *"When I was hired, I was promised to work with prototype testing and I have not done that until now, and that is also because of the distance between my manager and me. It is hard to tell him that you want some other job"* (Virtual team member, Denmark).

In this vein, informants often mention the necessity for global virtual leaders to be problem sensitive and seek to solve problems before they arise. As noted by this Danish virtual team member: "*Good leadership for me is when he is taking care of problems before they become a problem"*. Therefore, if the leader has a proactive problem solving approach, informants argue that the effectiveness of the team increases:

> *"Mainly, good leaders should be able to look into the future and clear out all problems that are going to arise. It takes some experience, maybe if you have a leader with five or seven years, maybe he has discovered all these issues and maybe it can be excellent. Bad leaders can create big problems that will easily disappear with good leaders"* (Virtual team member, Denmark).

Global presence through support

The results also show that granting support to virtual team members is important in order for the leader to establish global presence. As noted by a Danish virtual team member: "*I think it is very important that the manager is able to […] grant effective support and help the people.*" Support could for example be the transfer of information and skills from the global virtual leader to the team members:

> "*I think good leadership is when … things are being taking care of when you have a problem, and when you ask them something you can see that they [leaders] are actually doing something to find out how to deal with the problem. When they [leaders] are there for you*" (Virtual team member, Denmark).

Yet, informants would also highlight the necessity of the global virtual leader to show personal support. As noted by this Danish virtual team member: "*Management could be better for employee's performance when they know the personal stuff.*" An issue that arose in relation to this was for virtual team members to find the right type of support when needed. Thus, there was a tendency for individuals not to ask their virtual colleagues for support but rather a person in their immediate proximity. A behavior that could challenge the effectiveness of the team:

> "*In fact, if I have a technical question, I am supposed to call my colleagues on the project, instead I ask the one sitting next to me because I know him well. I think this is the same to all the colleagues; it is easier to ask the one close to you*" (Virtual team member, Hungary).

Thus, effective global leaders sought to give informative, skilled support in cases where virtual team members needed more information in order to perform their tasks. In addition, they created clear guidelines for members in the case support was needed, and showed personal interest in the individual team members.

QUANTITATIVE RESULTS RELATED TO VIRTUAL LEADERSHIP

In line with our qualitative findings we also conducted quantitative studies on this theme. In survey I we compared different groups in order to see who was most virtual and most mobile. Results show that leaders of virtual teams were substantially more virtual and more mobile than other team members. Controlling for management level we found that those with longer tenure were only slightly more virtual than those with shorter. We also found that older individuals were somewhat more mobile that younger when working.

Results with regards to mobility concerning age could probably be connected to family obligations. It is also interesting to see confirmation that managers in virtual teams actually do work more virtually and travel more than team members. This has to be taken into consideration when selecting managers for virtual teams. They simply have to be able to work more virtually and travel more compared to other members of the team (see table 4a, 4b, 4c in Appendix).

In relation to global virtual leadership we found that employees who feel they have been provided with clear goals from their virtual leaders also have higher satisfaction with virtual collaboration. Those who feel that the goals are very clear (value = 7) have a mean score on satisfaction with the virtual collaboration of 4.00 (see table 4e in Appendix). We also found that those employees who feel their leader is focusing on the virtual aspect of work also have higher mean scores on the satisfaction variable. Those who think their leader focuses very little on virtual collaboration (value = 1) only have a mean satisfaction score of 2.4, whereas those who perceive their leader to be very focused on virtuality have a mean satisfaction score of 4.00 (see table 4d in Appendix).

Finally, in survey III 220 virtual team members were asked in an open question: "Please describe what leadership capabilities you think are necessary in order to effectively manage virtual collaboration?" The answers were content analyzed resulting in 15 categories (see table 4e).

Table 4e: Ranking of the most frequent mentioned abilities that a virtual leader should possess	
1. Open minded	9. Good listening skills
2. Patient	10. Positive
3. Cultural understanding	11. Empathic
4. Good communication skills	12. Structured
5. Good language skills	13. Frequent communicator
6. Able to use situational leadership, focusing on the individual	14. Empowering
7. Able to set clear targets	15. Able to use communication technology
8. Honest and reliable	

In sum, the quantitative results show that virtual team leaders work and travel more than regular team members, and that the virtual leaders' ability to establish clear goals is crucial for team satisfaction. Finally, global virtual leaders need, among other things, to be open minded, patient, culturally aware, and have strong communication and language skills in order to be perceived as a good leader by virtual team members.

		VIRTUAL CHALLENGES	CREATE GLOBAL PRESENCE BY:
QUALITATIVE FINDINGS	LEADERSHIP CHALLENGES RELATED TO VIRTUAL COLLABORATION	Lack of physical presence	Create 'global presence' through knowledge of the project, clear targets and goals
		Lack of strong interpersonal personal relationship	Create 'global presence' through 'face-to-face' meetings during the project life time
		Lack of homogeneity in teams	Create 'global presence' to the individual team members through a flexible and proactive leadership style
		Lack of sense of support and recognition	Create clear procedures for gaining virtual support
QUANTITATIVE FINDINGS	Only leaders that are indeed able to work virtually and are mobile should be selected to lead virtual teams as they have significantly more virtual work than team members		
	Clear goals are very important for virtual team satisfaction		
	The leaders' focus on virtual issues is important for virtual team satisfaction		
	Being patient, open minded, and having good understanding of different cultures and the ability to communicate with them is highly important for virtual team leaders		

CONCLUSION AND CONTACT

The purpose of this report was to understand how temporal dispersion, cultural/linguistic differences, technological challenges, and virtual leadership would impact global virtual collaboration and the steps that Danish managers can take to address these issues (see executive summary and sub-conclusions in each chapter). In order to reach this aim we conducted 110 qualitative interviews and observation in three international organizations. Furthermore, quantitative data from three separate surveys in different Danish owned international organizations were obtained. As a general rule, names of individuals and companies are kept anonymous and we only disclose whether the respondents are global managers or regular team member and the national origin of the informant.

In case of questions and/or comments relating to the content of the report please contact:

Professor Jakob Lauring
Department of Business Administration
Aarhus University
E-mail: jala@asb.dk

Assistant Professor Anders Klitmøller
Department of Language and Communication
University of Southern Denmark
E-mail: ankl@asb.dk

APPENDIX: TABLES

THEME 1: LEADING TEMPORAL DIFFERENCES

QUANTITATIVE RESULTS RELATED TO TIME-ZONE DIFFERENCES

Table 1a: Mancova for Age (+ p<.10; * p<.05)						
Dependent Variables	**Lower**		**Higher**		**Multivariate Effect**	**Univariate F Ratios**
	N = 127		**N = 108**			
	Mean	**SD**	**Mean**	**SD**		
					3,10*	
Time zone adjustment scale	5,06	1,11	5,11	1,04		0,16
Alignment of virtual norms scale	5,26	0,96	4,97	1,06		4,74*

Table 1b: Mancova for Tenure (+ p<.10; * p<.05)						
Dependent Variables	**Lower**		**Higher**		**Multivariate Effect**	**Univariate F Ratios**
	N = 132		**N = 103**			
	Mean	**SD**	**Mean**	**SD**		
					2,69+	
Time zone adjustment scale	5,09	1,09	5,07	1,07		0,03
Alignment of virtual norms scale	5,26	1,05	4,96	0,95		5,00*

Table 1c: Hierarchical Multiple Regression * p<.05; *** p<.001		
	Satisfaction	Performance
	β	β
Step 1 (control)		
Gender	0,14*	0,13*
Adjusted R²	0,01	0,01
Step 2		
Time zone adjustment scale	-0,03	0,04
Alignment of virtual norms scale	0,38***	0,18**
Adjusted R²	0,14	0,04
ΔR²	0,13	0,03

THEME 2: LEADING CULTURAL AND LINGUISTIC DIFFERENCES

QUANTITATIVE RESULTS RELATED TO LANGUAGE AND CULTURE

Table 2a: Manova and Anova for Nationality (*** p<.001)				
Dependent Variables	**Danish**	**Non-Danish**	**Multivariate Effect**	**Univariate F Ratios**
	Mean (SD)	**Mean (SD)**		
	N=500	**N=170**		
			45,77***	
Virtuality	4,55 (1,15)	4,51 (1,10)		0,1
Mobility	3,07 (1,11)	3,09 (1,20)		1,65
Work-related English communication	27,63 (25,96)	62,69 (34,36)		154,14***
Personal English communication	12,76 (16,68)	38,44 (34,14)		124,11***

Table 2c: Results of Hierarchical Multiple Regression for Virtuality and the Perception of International Language Management [a]		
Variables	**Management common corporate language**	**Openness to language diversity**
	β	β
Step 1 (Control)		
Gender	-0,02	0,03
Age	0,09	,19***
Tenure	-,23***	-,19***
Organization	-,15***	-,24***
R^2	0,07	0,09
F	11,04***	17,86***
Step 2 (Virtuality)		
Virtuality	,23***	0,01
Mobility	-0,04	,11**
R^2	0,1	0,11
F	12,65***	13,57***

Table 2e: Regression model predicting satisfaction with virtual collaboration				
	Parameter estimates	**S.E**	**T-test**	**P-value**
English is default in dep.	0.191	.049	3.92	0.000
Control: Self-rated English skills	-0.070	.044	-1.59	0.113
Constant	3.294	.283	11.64	0.000
R-squared = 0.0693	**N=221**			

THEME 3: LEADING TECHNOLOGICAL CHALLENGES

QUANTITATIVE RESULTS RELATED TO TECHNOLOGICAL CHALLENGES

Table 3a: Results of Hierarchical Multiple Regression			
	Satisfaction	Virtual Team satisfaction	Performance
	β	β	β
Step 1 (control)			
Gender	0,14*	0,11	0,13*
Adjusted R²	0,01	0	0,01
Step 2			
Face-to-face communication	0,04	-0,03	0,04
E-mail communication	0,13	0,27**	-0,05
Telephone communication	0,11	0,09	0,09
Video conference communication	-0,05	-0,05	-0,02
Adjusted R²	0,04	0,08	0
ΔR²	0,03	0,08	-0,01

* $p<.05$; ** $p<.01$

Table 3b: Ancova for Age (+ $p<.10$)					
Dependent Variables	**Lower**		**Higher**		**Univariate F Ratios**
	N = 120		**N = 103**		
	Mean	**SD**	**Mean**	**SD**	
Access to training in collaboration technology	3,20	0,81	3,00	0,92	3,00+

Table 3c: Ancova for Tenure					
Dependent Variables	**Lower**		**Higher**		**Univariate F Ratios**
	N = 137		**N = 86**		
	Mean	**SD**	**Mean**	**SD**	
Access to training in collaboration technology	3,03	0,90	3,23	0,79	2,96+

Table 3d: Anova – effect of access to technical training on satisfaction with virtual collaboration			
Scale value	Mean	S.D.	freq.
1	2.70	1.16	10
2	3.32	0.75	37
3	3.62	0.71	98
4	3.85	0.55	71
5	4.60	0.55	5
Overall	3.62	0.75	221
$X^2(4) = 13.71$	P-value = 0.008		

THEME 4: VIRTUAL LEADERSHIP

QUANTITATIVE RESULTS RELATED TO VIRTUAL LEADERSHIP

Table 4a: Manova and Anova for Position [1,2]				
Dependent Variables	Managerial Mean (SD) N=140	Non-Managerial Mean (SD) N=531	Multivariate Effect	Univariate F Ratios
			38,73***	
Virtuality	5,05 (0,83)	4,41 (1,17)		31,38***
Mobility	4,04 (0,91)	2,82 (1,04)		148,99***
Workplace English communication	40,19 (30,05)	35,59 (32,62)		6,32*
Personal English communication	18,04 (22,94)	19,66 (25,58)		0,15
[1] N = 671 due to missing values				
[2] Covariates: Tenure, Gender				
* p<.05; *** p<.001				

Table 4b: Manova and Anova for Tenure [1,2]				
Dependent Variables	Lower Mean (SD) N=404	Higher Mean (SD) N=267	Multivariate Effect	Univariate F Ratios
			8,61***	
Virtuality	4,45 (1,20)	4,67 (1,02)		4,33*
Mobility	3,00 (1,17)	3,18 (1,07)		0,98
Workplace English communication	43,25 (33,70)	26,40 (26,62)		18,27***
Personal English communication	24,81 (27,58)	11,02 (17,70)		23,17***
[1] N = 671 due to missing values				
[2] Covariates: Position, Age				
* p<.05; *** p<.001				

Table 4c: Manova and Anova for Age [1,2]	Lower	Higher	Multivariate Effect	Univariate F Ratios
Dependent Variables	**Mean (SD)**	**Mean (SD)**		
	N=363	**N=307**		
			3,90**	
Virtuality	4,53 (1,15)	4,55 (1,12)		1,04
Mobility	2,95 (1,09)	3,22 (1,16)		7,49**
Workplace English communication	42,59 (33,52)	29,36 (28,92)		1,64
Personal English communication	24,25 (27,34)	13,40 (20,56)		2,54
[1] N = 670 due to missing values				
[2] Covariates: Tenure, Nationality				
** p<.01				

Table 4d: Anova – effect of having overall clear goals on satisfaction with virtual collaboration			
Scale value	**Mean**	**S.D.**	**Freq.**
1	2.60	1.52	5
2	3.00	0.63	6
3	3.12	0.86	17
4	3.19	0.83	27
5	3.65	0.60	65
6	3.87	0.59	77
7	4.00	0.59	24
Overall	3.62	0.75	221
$X^2(6) = 18.82$	P-value = 0.004		

Table 4d: Anova – effect of leader focusing on virtuality on satisfaction with virtual collaboration			
Scale value	**Mean**	**S.D.**	**Freq.**
1	2.40	1.52	5
2	3.33	0.82	24
3	3.52	0.68	115
4	3.94	0.56	71
5	4.00	1.41	4
Overall	3.62	0.75	219
$X^2(6) = 20.18$	P-value = 0.000		