Geotemporally Distributed Project Teams

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ABSTRACT *The aim of this paper is to enable a better understanding of interpersonal communications within virtual teams whose members are separated by long distances and/or time zones. To this end, the ideas of temporal diversity and temporal dissonance are combined to develop the concept of geotemporally distributed project teams. This complements existing theory by providing a way of understanding project teams, formed temporarily to perform a specific task, whose members are separated by time and/or distance, and communicate using computer mediated technology. This definition is expanded into a theoretical framework that opens up new lines of inquiry that has the potential to produce new perspectives on theory and practice in the areas of virtual work and group processes.*

Keywords: Group Dynamics; Group Processes; Virtual Work; Team Processes

"I understand that the PM has addressed this in a press conference in Turkey in the last few hours. I haven't seen what she said, but let me say I support what it is that she said." Bill Shorten MP, speaking to the media, 26th April 2012.

As organisations have become increasingly international in their reach, so, with the support of advancing communications technology, have projects undertaken for and by these international organisations expanded into global execution. With this global execution has come the establishment of internationally distributed project teams, comprising large and small groups of participants located in many different countries and time zones, brought together for a finite period to complete a specific project or part thereof. While there has been a substantial effort made to define the nature of various forms of virtual teams and the communication media used to facilitate and support their communication (Dixon & Panteli 2010), understanding the functioning of interpersonal communication among these teams is a complex task that has, as yet, received little attention from the academic community (Henderson 2008).

Historically, communication between branches of a global business could take between hours and months with messages carried firstly by hand and then by electronic media. During earlier times

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the biggest issues associated with communications was the transmission time between the sender and recipient. Since industrialisation, time, in a working sense, has been seen and treated as a commodity so fundamental to people in any culture that they perceive their view of it as 'simply an immutable part of reality' (Bluedorn & Denhardt 1988: 300); a commodity which has been assumed to have the same characteristics and value everywhere in the world. However, one only has to consider the perspectives of different cultures to see that the concept of time is, in fact, assigned different values by different people. This has been complicated with the advent of modern, instantaneous communication tools. Temporal issues have now moved from transmission time to the chronological time where the message is received and the relative expectations of the sender and recipient as regards the timeliness of actions resulting from the message. Different expectations are especially evident when the message may be received at midnight, mid day or anywhere in between. The recent statement by Bill Shorten MP quoted above, and the subsequent media reaction to it demonstrated one issue associated with the expectations of timeliness, where it was assumed by all or most parties that the message had been sent and received. Clearly this was not the case.

Research into international project teams has been lost to some extent in the general discussion of virtuality, leading to a need for specific examination of how they function. The aim of this paper is to define a new concept of 'Geotemporally Distributed Project Teams' and introduce a theoretical model that may be used for further research in this area.

A MODEL OF GEOTEMPORALLY DISTRIBUTED PROJECT TEAMS

Temporal Diversity

The term temporal diversity, and the closely associated and occasionally interchanged term temporal dissonance, have a number of different interpretations among researchers (Albert 2002). Temporal diversity has been used as a catchall term, encompassing many different temporally related concepts. Work undertaken by Ballard and Seibold (2003) included a broad review of temporal influences in organisations, where the authors identified and considered 10 different temporal dimensions; separation, scheduling, precision, pace, present time perspective, future time perspective, flexibility, linearity, scarcity, and urgency as they are applied to organizational communication through three

structures of coordination methods, feedback cycles, and workplace technologies. Much of this work builds on, or is supplemented by, specific research into areas such as perceptions of the speed or pace of time and its impact on the lives of those impacted by these changes (Albert 2002); requirements to work extended or non standard work days to align with those in other time zones (Chudoba, Wynn, Lu & Watson-Manheim 2005); breakdowns in communications resulting from the pressures of working in a virtual context with project team members in different time zones (Daim, Ha, Reutiman, Hughes, Pathak, Bynum et al. 2012); and temporality in the context of how a diversified workforce evolves over the longitudinal life of a relationship (Acar 2010).

The diversified perspectives of time between individuals and groups was studied by Zembavel (1981) who proposed the concepts of temporal symmetry and temporal asymmetry, where symmetry infers that individuals have the same perspective of time and asymmetry that they have different perspectives of time. Subsequently, it has been suggested that groups within virtual teams may form stronger bonds where they have shared views of time, so those with a higher time urgency will gravitate toward one another and similarly those with a lower time urgency will also form stronger groups (Saji 2004). However, many researchers such as Dixon and Panteli (2010) include time zones among their identified discontinuities but don't explore the impacts of the time zone differences beyond commenting that discontinuities such as time zone differences will contribute to communication problems when compared to co-located teams.

Espinosa, Cummings and Pickering (2012) investigated the correlation of separation by distance and by time zone and found that when collaborators are separated by more than a few meters the level of collaboration does not vary substantially, however, separating collaborators by increasingly large time zone gaps leads to increasing difficulty in the collaboration, with the working day splitting into two distinct components; overlapping and non overlapping time. As the non overlapping time increases organisations have addressed the associated lack of communication by imposing a flexible or modified working time for some personnel. A number of researchers (Kayworth & Leidner 2000; Lu, Watson-Manheim, Chudoba & Wynn 2006) found that temporally distributed team members found it stressful to be limited to only communicating asynchronously with their team members once the separation exceeds the length of a working day. Some team members reported that they felt issues

were not fully addressed due to the lack of richness inherent in asynchronous communication tools such as email. Further, Kayworth and Leidner (2000) suggested that technology used to support and facilitate communication in virtual teams does have its limits and some technology is far more suited for some environments than others. This is supported by Talha, Manzil and Qaiser (2006) who found that where companies have development centres located 8 time zones apart to allow for a 24 hour development cycle, the teams are highly reliant on asynchronous communications, reducing the effectiveness of their communication significantly. This finding suggests that some degree of overlap to allow synchronous communication would make them more effective.

Virtual Teams

While much of the published literature on virtual teams makes reference to the impact of working across multiple time zones on organisations and projects, generally it refers to the effects of the time zones in a hygiene sense. That is, stating that the management of multiple time zones must be carefully considered and that the effects of temporal separation can be significant. Gevers, van Eerde and Ruthe (2001), in considering the effects of temporal separation on the efficiency of the team, found that team members are typically more productive and committed to their work when they don't feel temporal pressures during their workday, however, little other research has been conducted into this area of temporal diversity and its impact on the efficiency and well being of the team and its members. Of those considering the temporal separation impact on the well being of team members, Nurmi (2011) identified that psychological strain associated with being a member of a temporally distributed virtual team can be associated with the difficulties of communication when compared to communicating with co-located colleagues. Nurmi's (2011) research identified that a lack of clarity around expectations from the rest of the team resulted in increased time spent emailing, additional travel to attend face to face meetings and extended workdays all culminating in increased stress on the personnel involved. This is a view supported by Espinosa et al. (2012) who identified that having to switch frequently between synchronous and asynchronous communication can become cognitively costly on those involved. When added to the complexity of managing communications and relationships across potentially multiple time zones, this compounds the cognitive load on the

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personnel involved, resulting in a potential deterioration in the efficiency and productivity of the team members. Nurmi (2011) further suggested that there are a number of individual coping strategies used to manage the job demands associated with the problems coming from being part of the virtual team, but that all of these strategies have associated psychological costs to the individual involved. Nurmi's (2011) research suggested that these issues affect both sides of the virtual team relationship; with the personnel working remote from the hub of the project feeling uncertain about what is expected of them, while those in the hub feeling uncertain that their remote colleagues are going to deliver what is expected of them on time.

In studying the economic value of outsourcing, Matsuoka (2010) identified issues such as health problems, incompatibility with leisure time of the family, and availability of services during night time as issues facing personnel working non standard hours to suit a particular time schedule. There are, however, benefits available to individuals working in virtual relationships. For instance, LaBrosse (2008) identified the fact that such personnel are able to work from their home location, which while the disturbances of working across multiple time zones may impact the home life of these individuals to a certain extent, they are still able to return home after their working day as opposed to working at a remote location, separate from family and home life. This virtual work model also removes much of the physical stress and company expense associated with travel to the remote locations. Also, properly managing the allocation of work between geotemporally distributed teams can increase the perception of fairness among team members (Lu et al. 2006)

Geotemporal Leadership
There is little disagreement among researchers that the task of leading a geotemporally distributed team is more complex than that of leading a co-located one, with some researchers even going as far as suggesting that some individuals may suffer psychological stress when trying to manage those with different temporal perspectives to their own (Bluedorn & Denhardt 1988). The effective boundary spanning leader (Ernst & Chrobot-Mason 2011) is one who is actively engaged in ensuring the various members of their team are coordinated, protected from some of the issues associated with the boundaries they work across, maintaining the integrity and strength of the boundaries, coordinating

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and building trust among the various team members (Kleij, Schraagen, Werkhoven & Dreu 2009; Lu et al. 2006; Nydegger & Nydegger 2010; Shriberg 2009). These leaders need to have greater levels of tolerance and understanding of temporal diversity and a developed acceptance of ambiguity. Through the development of these skills managers may be able to build stronger teams where personnel feel more appreciated regardless of their temporal perspective (Mukherjee, Lahiri, Mukherjee & Billing 2012).

In using coordination theory, Cummings, Espinosa and Pickering (2009) discussed the impact of different time zone separations on the ability of a distributed team to effectively coordinate their work; the different tools available to teams, whether they are separated by only a couple of hours or by 12 hours and how that separation and the communication approaches used by the project protagonists effect the coordination of the team groups. When managing team members separated by multiple time zones, LaBrosse (2008) found that it is better to be temporally sensitive when selecting meeting times to avoid too much out of hours working for distant team members and Rosen, Furst and Blackburn (2007) have suggested that, when planning meetings between the separated team members, the meeting organisers should vary the meeting times to at least make the temporal disturbance fair for all team members.

Geotemporally Distributed Project Teams

The generally accepted definition of a virtual team is 'groups of geographically and/or organizationally dispersed coworkers that are assembled using a combination of telecommunications and information technologies to accomplish an organizational task.' (Townsend, DeMarie & Hendrickson 1998: 17). However, as Bell and Kozlowski (2002) pointed out, the term virtual team has been used to cover a wide variety of organizational structures, all of which could fit within Townsend et al.'s (1998) description, leading to substantial confusion when attempting to explore specific forms of virtual teams. Within the broad concept of virtual teams lie many different team structures such as permanent organizational structures where large or small groups of personnel are separated by time and distance, temporary structures where one or more team member works remotely from the balance of the team, structures where team members work within a common city or country, either working

from home or from small offices etc. The term geotemporally distributed project teams has been introduced in this paper to attempt to more explicitly describe the nature of the teams in question here, specifically the form of team discussed is one which combines the definition of Townsend et al. (1998) above with the definition of a project as 'a temporary endeavor undertaken to create a unique product, service, or result' (PMI 2008: 5) to define a geotemporally distributed project team as 'a group of geographically and/or temporally dispersed coworkers, temporarily assembled using appropriately selected communication techniques to undertake or create a unique product, service or result'.

While current research addresses a number of issues associated with the impact of temporal diversity, it also allows for some opportunities for combining the findings of researchers to infer possible opportunities to expand on current theories and also a number of avenues for future research. One opportunity to combine work from a number of current theories and literature would be to look at ways in which different levels of temporal diversity could be best managed dependent on the degree of time zone separation between parties, to suggest possible optimisation approaches that would allow individuals working at different distances of temporal separation to get the best from each other while enduring the least amount of stress and disturbance. A number of authors (Kayworth & Leidner 2000; LaBrosse 2008; Lu et al. 2006; Nurmi 2011) identified that team members who were separated by substantial time differences were under greater stress than their colleagues who could be working with co-located or closer located team members. Espinosa et al. (2012) suggested that frequent switching between modes of communication, from synchronous to asynchronous also places additional stress on team members. Therefore it could be implied from the work of these researchers, that it may be better to adopt and standardise selected forms of communication for closer temporal separation and develop another limited communication methods palate for those with greater temporal separation, to avoid the cognitive stresses of trying to use all approaches for all situations. This strategy assumes that all parties have the same concepts of temporality and that all parties work the same office hours. Since a 4 hour time difference where the team members at each location work different hours will result in different temporal issues to one where both parties work to the same baseline, a fixed temporal

separation between two groups with substantially different temporal perceptions would have different requirements to the same temporal separation between two groups with similar temporal perceptions.

Proposition 1

There are some forms of communication that are more effective between geotemporally distributed teams who are separated by fewer time zones and others that are better suited for teams separated by greater distance or time zones, and that it is better for teams to adopt these forms of communication and either discard or use sparingly other forms.

An opportunity for further investigation and expansion of recent research would be to examine to a greater extent what skills and attributes a successful leader of geotemporally distributed teams needs. What makes for a good leader of these teams and what attributes are less desirable? For example, how leaders could use the attributes of personnel with different perspectives of temporality to potentially bring benefits to the projects in which they are engaged, where those who are highly motivated by timely delivery of tasks could be engaged with highly time critical activities while those less timeliness motivated could thrive on other tasks. For instance, the work of Mohammed and Nadkarni (2011) explores the effects of temporal diversity on the outcomes of teams from the perspectives of time urgency, pacing style and future time they propose that strong and effective team temporal leadership would enhance the performance of temporally distributed teams by building on the benefits of temporal diversity within the team while endeavouring to avoid any potential negative influences of those differences. Identifying the optimal traits and skill sets of strong geotemporal leaders would help to ensure the right personnel were assigned to these roles, increasing the productivity of the teams they lead and allowing for the focussed development of their successors.

Proposition 2

There are particular characteristics and skills of both leaders and team members that make them more suited and more effective as participants in geotemporally dispersed project teams, that these characteristics and skills can be identified, developed and leveraged to make the projects these individuals are engaged in more effective.

In their review of advances into team effectiveness between 1997 and 2007, Mathieu, Maynard Rapp and Gilson (2008) identified a number of additional opportunities for further investigation.

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Many of these opportunities are still waiting to be explored in the context of geotemporal leadership. Some examples include how interpersonal factors such as conflict management and motivation affect the outputs of these dispersed teams; how trust can be established, developed and maintained between the individuals and groups; how the level of trust influences outcomes; and how the management of these geotemporally distributed teams can help to engender collective cognition within their team such that they all work together toward a commonly understood goal.

To develop the idea of geotemporally distributed project teams, the Input – Mediator – Outcome team effectiveness framework (Mathieu et al. 2008) is employed as a basis for a theoretical framework. This framework illustrates the factors influencing the effectiveness and outcomes of the projects in which the geotemporally distributed project teams are engaged (Figure 1).

Insert Figure 1 about here

Within the framework, the nested boxes within the input section depict the individual members forming part of and being influenced by their respective geotemporally distributed project teams. These project teams form part of the project delivery organisation, which is typically a sub set of the overall organisation, working to the organisational procedures and practices. These organisations are themselves subject to the influences of the societies and cultures in which they operate. These influences are likely to be stronger as they progress toward the centre of the nested organisation than as they radiate toward the outer shells, meaning that the influence of the organisation on the teams and the individual members of the teams is expected to be greater than the ability of the teams and individuals to influence the overall organisational communications culture. This difference in strength of influence is indicated by the use of solid lines pointing inward within the nested groups and the use of broken lines pointing out from individuals, teams and organisations. At the individual and teams level, the interaction between the separate groups and their individual members within their project organisation is depicted by the two headed arrow connecting the teams. Each of these teams and the individuals within them will bring with them their own sets of values and communication styles which will influence at the micro level how the teams form and interact. These individuals and teams then

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undertake tasks using processes that would typically be defined by their organisations, professions and local customs as indicated in the mediators phase of the figure. These tasks then result in the achievement of the various required work outcomes. As required, some of the outcomes must then be adjusted through recycling the outputs back through the mediators phase until the final outputs meet the organisation's requirements. The experiences of the members and their respective teams and their efficiencies of achieving the outcomes during the execution of the processes will also result in ongoing feedback and organisational learning as shown by the dashed lines of the informal feedback loops. The feedback will be a combination of positive and negative experiences resulting from the individuals and teams in each of the geotemporal locations which will serve to inform, adjust and reinforce the behaviours and expectations of the members. For example, if the teams communicate and interact in a particular way that is positively received by their geotemporally distributed colleagues and that results in a positive outcome for the project it will positively reinforce team relationships. Alternatively, if the teams try something different, which is either not well received or results in a negative outcome, the experiences may well erode the strength of the relationship between the parties. All of these activities are experienced over time, as indicated by the solid line running along the bottom of the framework. The passage of time brings with it changes in team composition, joining of new members and teams along with the departure of other members and teams from the project organisation, changing project priorities and phases of work along with the ongoing evolution and development of the teams and members' relationships, all of which result in ongoing individual, team and organisational learning's.

CONCLUSION

The work that has so far been undertaken in identifying and understanding virtual teams and temporal diversity sets a solid foundation for the understanding of geotemporally distributed project teams. However this work still leaves many knowledge gaps in relation to how these teams are formed. How they function in both the static sense, when the team is in a stable structure, and as it evolves over the changes of project requirements. A better understanding of the functioning of these teams could be used to improve their function and effectiveness, both in the short term, to understand the present form of geotemporally distributed project teams and in the ongoing development and use of the approach as

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the execution of projects becomes more and more globally distributed as a standard way of working. Much further work is required to fully understand the interaction between the groups comprising these geotemporally distributed project teams. For instance, exploring how these temporary project teams form and, during the formation process, how lines of communication are established and evolve; what communication mechanisms and approaches work best in any given situation, whether it is indeed better to adopt one or two particular techniques for some degrees of temporal or geographic separation and others for different degrees of separation; how trust is built and maintained within and between these temporary teams, particularly when many members of these teams will never meet face to face, will have different personal and organisational drivers and will have different tenures and commitments to the projects; how different levels of tenure of both individuals and teams within the project organisation impacts the communication efficiency of the teams and the overall project; whether different business and industrial sectors have individual characteristics as far as how geotemporally distributed project teams function. For example, do these project teams function differently in a software development organisation when compared to a resources engineering and construction organisation; and how much does the corporate culture of a business organisation or of the specific project structure influence the ability of a project executed by that organisation, when it is undertaken using a geotemporally distributed project team, where the individual groups within the team will have different regional or corporate cultures and work practices.

The use of virtual teams in their many forms is now a broadly accepted part of the business and project landscape and the adoption of geotemporally distributed virtual teams as a sub set of the overall virtual teams approach is one that is here to stay. However, as many researchers have identified, the work so far completed on the understanding of the approach leaves many gaps yet to probe and fully understand (Bell, Villado, Lukasik, Belau & Briggs 2011; Henderson 2008; Horwitz & Horwitz 2007; Mohammed & Nadkarni 2011). In a world with shortages of skilled personnel, where projects are being undertaken in new and emerging markets and with ever increasing technological challenges, the need to better understand the functioning of the organisational structures that have emerged to address these challenges is immediate and pressing.

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Figure 1: Input - Mediator - Outcomes model of Geotemporally Distributed Project Teams
(after (Mathieu et al. 2008))

Inputs   Mediators   Outcomes

Societal and Cultural

Organisation

Project

Team — Members

Team — Members

Processes

Multiple Criteria

Temporal Developmental Process

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