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Institutional Collaboration, Context and Learning

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INSTITUTIONAL COLLABORATION, CONTEXT AND LEARNING

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Abstract

Collaboration between institutions is inherently difficult; requiring working across different worlds.

In this paper collaborative activity between institutions is conceived of as an actualisation of context in the social relations of production of the evolving collaborative activity.

The paper draws on the work of Marx in unfolding the social relations of production of a Marine ICT Cluster and three main institutions involved in the evolution of the Cluster. As the Cluster evolves perceptions of tensions and contradictions is an inevitable process of the mediation of context embedded in the social relations of production. Learning is inherent in these social relations. Using these core concepts, this paper aims to bring together a conceptual framework developed in my PhD thesis.

Introduction

Profound changes in the social relations of production of capitalism entail an increasing need for collaborative activity. This increase in collaborative activity is evident in the need for firms to work as part of a supply chain and/or as part of activity in a regional milieu (Camagni, 1991; Gulati, 1999; Keeble, Lawson, Lawton Smith, Moore & Wilkinson, 1998), in the need for service organisations to interrelate with a range of other bodies and the rise of clusters which buy and sell from each other and clusters which also have links with a range of other organisations such as research organisations, professional bodies, peak industry bodies, training and educational institutions and so on. .

This paper focuses on collaboration between institutions; important because institutions 'structure social and political behaviour, defining the rules of the political game and as such define who can play and how they play' (Voss, 2004, p. 7562). Institutions have a place in managing relations and a major role in creating environments for successful change – politically, socially and economically. They are strategically placed to inform and implement policy, shape consultation processes, findings and information sharing. Without collaborative activity,

institutions become dysfunctional. They are unable to undertake their work of making or influencing policy, of consulting and working with constituents to determine future directions and to meet needs.

Given that collaborative work requires multiple, complex, ever-changing relations across an array of organisational forms and patterns of multi-organisational relations (White, 2001) we need to better understand this complex activity. Much of the literature on collaboration identifies typical themes such as trust, project management, flexible management approaches, communication and coordination (Barnes, Pashby & Gibbons, 2002; Vangen & Huxham, 2003); leadership and credibility (Reynolds, McCormack, & Ferguson-Patrick, 2006; Scott 2004) and risk management (Prigge, 2005). These largely managerialist studies deal poorly with the complexity of collaborative activity, with the tensions and contradictions inherent in such activity.

An activity theoretical perspective would argue that in order to influence the trajectory of institutional collaborative activity, it is necessary to understand and analyse the tensions and contradictions within that activity. This paper argues that not only is it necessary to analyse the tensions and contradictions situated within the activity, but it is also necessary to analyse the wider context and how it mediates and contributes to tensions and contradictions within the activity. Although activity theoretical studies typically set the analysis of activity within a *situated* context there has not previously been a study of how the social relations of production mediate collaborative activity. Rather, studies tend to note the context, but not build it into the analysis. For example, Engeström, Engeström and Vahaaho's (1999) discussion of knotworking situates knotworking within a mode of production of co-configuration work (p.348). In his study Engeström provides the reader with an analysis of actions between actors representing their respective collectives, analysing the "redistribution and reconceptualisation of control, responsibility and trust" (p, 355). The mediation of the mode of production is *not* an explicit part of the analysis. This paper develops an additional dimension of activity theory by showing how contextual conditions through the social relations of production, mediate collaborative activity.

This paper is based on the author's Doctoral thesis of a case study of the Tasmanian information technology industry institutions and their collaborative activity. Interview data, some observational data and collection and analysis of documents was undertaken using an activity theoretical approach for both the collection and analysis of data. The three key institutions discussed in this paper are:

- TasIT; an employer lobby group representing employers in the information technology industry and other organisations that are significant users of information technology
- The Department of State Development, a government department responsible for state economic development, including industry development
- Intelligent Island, the Board and secretariat set up by State and Commonwealth governments to allocate $40 million to the Tasmanian information technology industry, from the part-sale of a government instrumentality

The particular focus of analysis was an industry-initiated Marine Information Communications and Technology (ICT) Cluster. The Cluster was an industry driven cluster, a bottom-up process where collaborative activity was initiated and driven by TasIT, the employer institution. The intent of TasIT was to develop a cluster that provided opportunities for small IT firms in the State to gain competitive advantage over larger mainland firms. Key institutions involved along with TasIT were two government institutions – Department of State Development and Intelligent Island – and research institutions as well as firms. The Marine ICT Cluster evolved over a period of two years with a range of participating institutions and firms moving in and out of the collaborative activity. Those involved included research institutions and private firms, in addition to TasIT, Department of State Development and Intelligent Island.

Contextual Conditions

The rather amorphous term context, is defined here as contextual conditions. Seven contextual conditions that mediate collaborative activity were identified from the study of Tasmanian information technology institutions. The contextual conditions are:

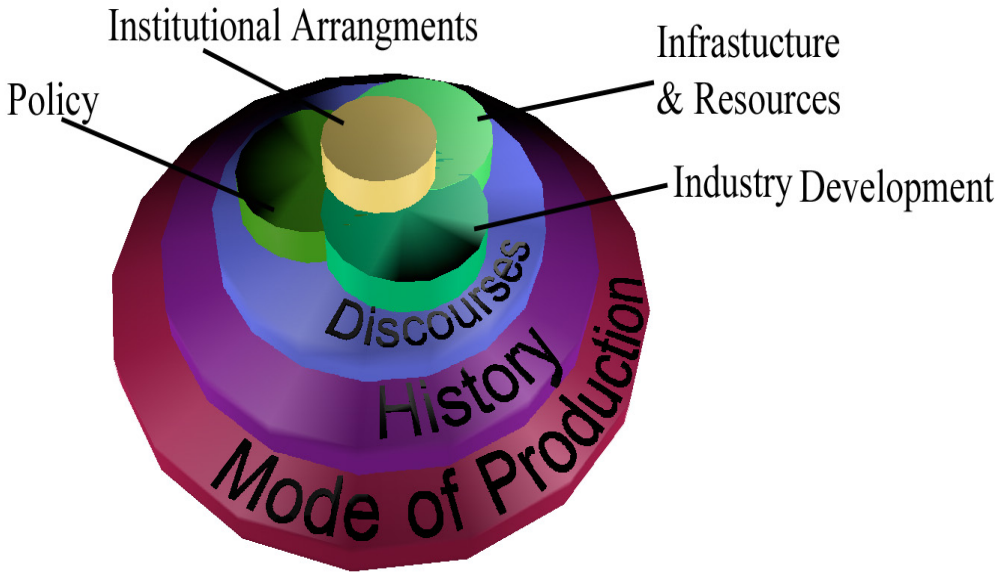
1. Mode of production
2. History
3. Dominant discourses
4. Government policy
5. Industry stages of development
6. State, national and/or regional infrastructure
7. Institutional arrangements

All are interconnected, influencing each other, however, the mode of production sets up relations, possibilities and constraints. History – what has gone before – influences possible trajectories within the mode of production, contributing to discourses, be they hegemonic discourses, institutional, professional or other discourses. Government policy is made within these relations, most often using the language and therefore the possibilities that language shapes, of hegemonic discourses. The infrastructure, topography and resources of a region or state also mediate what is possible, as does the stage of development in an industry. As shown in Figure 1 institutional arrangements sit at the core of these conditions, mediated by each of the conditions listed previously. A layered spiral image is employed to illustrate these interconnections. The wider end in Figure 1 of mode of production is indicative of the mode of production and history mediating all other contextual conditions. The following brief explanation of each condition refers to some of the literature informing the identification of these conditions.

The mode of production is capitalism. Within capitalism there are multiple modes of production, some are more prevalent in particular industries than others. The Australian

information technology industry, for example, has a dominant mode of production which favours contractual arrangements for work. Mode of production refers to both the capitalist mode of production (which is constantly evolving, see for example Gee, Hull & Lankshear, 1996; Victor & Boynton, 1998) and more specific modes of production within specific industries. An example of the mediation of the mode of production is the movement of labour within a region, contributing to the flow of information and knowledge creation (Keeble et al. 1998).

Figure 1: Contextual conditions



History refers to pathways (Putnam, 1993) created as a result of historical activity. What has gone before mediates possibilities or affordances for future activity. For example, Maskell and Malmberg (1999) identify historical processes as influencing the development of trust in a region. Engeström (1999) lists historicity as a principle of Activity Theory. It is necessary to analyse the history of the ideas and tools that have shaped the current activity.

Hegemonic discourses. Discourses, are the assumptions inherent in social practices. Hegemonic discourses refers to dominant 'assumptions', ideologies and practices, necessary for capitalist production in the global marketplace. There are multiple discourses, for example, those that are typical of the 'new capitalism' such as managerialism (Gee et al., 1996), industry discourses, professional discourses and discourses specific to a community of practice. Be they hegemonic or other, discourses underpin all tools and mediate objects by contributing to evolving meanings and norms over time. Blackler (1995) identified this when he wrote about knowledge as a mediating and normalising practice.

Industry development refers to the stage of development of an industry. The industry stage of development has implications for industry practices and networks. The Tasmanian information technology industry is a sunrise industry. The industry's youthfulness and immaturity had considerable implications for collaboration between the institutions that are the focus of this study.

State, national and/or regional infrastructure and resources is the presence and density of institutions such as universities, research institutions, training organisations, recruitment agencies and industry bodies. Keeble et al. (1998), for example, identifies the importance of the presence of such institutions within regional milieu.

Policy refers to government policy, be it state or national policy. Government policy is obviously important in that it has a major influence on state, national and/or regional infrastructure and industry development. These conditions influence each other, creating or limiting pathways of affordances.

Institutional arrangements denote the formal and informal arrangements between institutions. Amin and Thrift (1997) and Camagni (1991) refer to these arrangements as regional collective learning where there is an exchange of information and the development of trust. As illustrated in Figure 1 institutional arrangements sit astride all other contextual conditions, being dependent on all the other conditions, yet also influencing them.

Given that the purpose of this paper is to show how these contextual conditions mediate collaborative activity it is necessary to understand what is meant by the term 'mediation'.

Mediation

Historically the concept of mediation comes from the work of Vygotsky in the 1920s, who argued that human *action* is mediated by culturally meaningful tools and signs. A recent activity theoretical scholar, Lekortsky (1999, p.66) explains Vygotsky's concept of mediation as, 'human beings create stimuli that determine their own reactions and are used as means for mastering their own behaviour.' Wertsch (1998) takes this concept and further develops it, providing ten claims about mediated action. Table 1 lists these claims and provides an explanation of how each claim contributes to an understanding of mediation.

Table 1: Ways in which Wertsch's 10 claims add to an understanding of mediation

Claim	Contribution to what is meant by mediation
1. There is irreducible tension between the agent and the mediational means (tools)	Relations between the agent or subject and the tools they use is dynamic, there is a dialectical tension between these elements
2. The materiality of mediational means	Cultural tools exist across time and space
3. Action has multiple, often conflicting goals	Action through mediational means has multiple goals. Because relations between the subject and the tools they use is dynamic and there is dialectical tension, there is often conflict between the multiple goals the action is intended to achieve
4. Mediated action is historically situated	Historical precedent is embedded within the tools we use, and these mediate our conceptualisation of skills and intelligence
5. Mediated action provides both affordances and constraints on action	The tools used and the relationship between the tool(s) and the subject influence not only what the subject perceives as possible and not possible, but, because the tool(s) are historically situated, what the situated context allows.
6. New tools transform action because they determine the structure and flow of action	New tools inform, influence and shape the organisation of labour, that is, access to tools, the distribution of tasks, the consumption of tools, including skills and knowledge
7. Mastery of tools involves following the patterns, the cultural, historical and institutional requirements of a tool	Embedded within tools are their historical, cultural and institutional patterns. When subjects master tools these patterns are learnt, but not necessarily valued or internalised.
8. Appropriation of tools refers to making one's own the affordances and constraints inherent in the tool	In mastery of tools, subjects 'learn' the historical, cultural and institutional patterns without internalising them. Whereas when subjects *appropriate* tools they internalise the historical, cultural and institutional patterns. That is, subjects value and believe in the patterns, consciously or unconsciously.
9. Consumption of tools in ways that are no longer applicable in a given situation and time can impede performance	When tools are used and appropriated without conscious thought, there is no awareness of the ways in which they inform and influence the perception of possibilities and constraints
10. Power and authority are to varying degrees inherent in tools.	Not everyone has equal access to each tool, or equal ability to use or consume the tool(s)

Wertsch's 10 claims are in relation to mediated *action*, that is, action of the subject as they use tools to achieve multiple goals. Important in this paper is the concept that mediation is integral to the social relations of production. Marx employs the terms consumption and distribution as part of explaining the relations of society 'generated by the development of

production' (Leontyev, 1977, p. 3). Table 1 indicates that contextual conditions (for example, historical patterns) are embedded within tools which are variously consumed by the subject. The ways in which the subject consumes tools, the distribution of tools or access to them and the exchange between the subject and the object are more than mediated *action*; it is mediated *activity*. Thus, the following ideas are key to an understanding of mediation and contextual conditions:

- Just as tools provide affordances and constraints, so do contextual conditions provide affordances and constraints
- Just as subjects appropriate and master the cultural, historical and institutional patterns of tools, so do they appropriate and master the cultural historical and institutional patterns of contextual conditions
- Contextual conditions provide affordances and constraints for access to tools and the consumption of tools
- Contextual conditions are dynamic, have within them their negation, that is, there are dialectical tensions within contextual conditions

Conceptualising Collaborative Activity

Collaborative activity takes place at the boundaries, requiring boundary crossing. Boundary crossing involves activity being carried out across different practices, with different forms of engagement, different histories, different definitions of what matters and different repertoires Wenger (1998, p.140). Collaboration at the boundaries is difficult; it is, of necessity about encountering difference, it requires distributed learning and the development of tools, mutual learning and an ability to recognise meaning in each other (Luff, Hindmarsh & Heath, 2000; Blackler Crump & McDonald, 2000; Engeström, Engeström & Karkkainen, 1995; Wenger, 1998). These different forms of engagement, different priorities, and learning can be better understood through analysing the social relations of production of the collaborative activity through the collaborative *object of activity* and *the object of production.* An explanation of these terms follows.

Production, consumption and exchange (Marx, 1973) generate social relations within collaborative activity. Collaborative activity is a process of production, in that labour power is used or consumed through tools, tools and materials are made accessible, that is, distributed within collaborative production to meet a need, as explained by Leontyev:

> Human needs are generated by the development of production. After all, production is directly also consumption, which creates need. In other words, consumption is mediated by a need of an object, its perception or its mental presentation (Leontyev, 1978, p. 2).

Relations of production are mediated by consumption and by the object of consumption. Likewise, exchange, is linked with production, 'mediating between production with its production-determined distribution on one side and consumption on the other' (Marx, 1973 p. 99). Within collaborative production, exchange between consumption and distribution is the process of mediation between the distribution of tools, labour and materials, and their consumption for production.

So, collaborative activity can, in part, be understood as a process of production, mediated by production *within* collaborative activity, consumption, distribution and exchange, and by contextual conditions intrinsic to these relations of production. Tensions and contradictions are inherent in social relations of production. To more fully appreciate the tensions and contradictions in collaborative activity, it is useful to follow Engeström's advice to 'follow the object' (2004). By following the object, it is possible to appreciate the interaction of each participating organisation and the interaction of their processes of production. Following the object also assists with untangling how contextual conditions mediate the collaborative activity.

It is useful to return to Marx in an attempt to clarify the term object. In his discussion of production Marx notes:

> Production is… consumption, consumption is also immediately production. Each is immediately its opposite. But at the same time a mediating movement takes place between the two. Production mediates consumption; it creates the latter's material; without it consumption would lack an object. But consumption also mediates production, in that it alone creates for the products the subject for whom they are products. A railway on which no trains run, hence which is not used up, not consumed, is a railway potentially, and not in reality… Consumption produces production in a double way, (1) because a product becomes a real product only be being consumed. … Only by decomposing the product does consumption give the product the finishing touch; the product is production not as objectified activity, but rather only as object for the active subject; (2) because consumption creates the need for *new* production, that is, it creates the ideal, internally impelling cause for production, which is its presupposition. Consumption creates the motive for production; it also creates the object which is active in production as its determinant aim. (Marx, 1973, p.91)

This explanation by Marx on the dynamic mediating relationship between production and consumption provides a useful insight into ways of conceptualising 'object'. Marx (1973) suggests there are two forms of object. There is the object (or motive) which is the 'impelling cause for production which is its presupposition'; and there is the object of consumption, produced by production. A useful differentiation between the object or motive which is the "impelling cause for production" and the object produced, is to refer to that which is being produced for consumption as the *object of production*, and that which is the presupposition for production, as the *object of activity*.

In collaborative activity the object is formulated through the object of multiple systems of activity, meeting multiple needs. The concept of an overlapping or potentially shared object (Engeström, 2001) is an important one in conceptualising collaborative activity. In collaborative activity, we can refer to this overlapping object as the *collaborative object of activity* — the presupposition for production). There is also the *object of production*. The evolution of the object of production in the evolving Marine ICT Cluster is explored in the next section, following an explanation of the object of collaborative activity.

How Contextual Conditions Mediate Institutional Collaboration

The developing Marine ICT Cluster provides an interesting case study for illustrating not only that context *does* mediate collaborative activity, but is illustrative of the *ways* that context, or rather contextual conditions mediate institutional collaborative activity.

The Object of Collaborative Activity

Following the object of activity (Engeström, 2004) of each of the institutions involved and the object of collaborative activity provides an analytical tool for mapping for tensions and contradictions of the collaborative activity. It is also necessary in order to analyse the ways in which contextual conditions mediate the collaborative activity. The object of activity of each of the three institutions most involved in the development of the Marine ICT Cluster (TasIT, Department of State Development and Intelligent Island) overlapped enough to identify, sustainable industry development as an object of collaborative activity. To assist in uncovering the sources of tension it is useful to understand the source of this overlapping object by examining each institution's object-oriented activity and their goal oriented action.

Table 1 uses Leontyev's (1978) levels of activity – object, and action – goal to illustrate differences and similarities between each institution's object-oriented activity and their goal oriented action. These differences and similarities are important for two reasons: one because they are sources of tension and contradiction within the collaborative activity; and two because actions carried out to achieve the institution's goals, are reflective of contextual conditions within the collaborative activity of the Marine ICT Cluster. In turn these mediate contextual conditions. For example, Intelligent Island's goal of encouraging exports is embedded in their discourses as will be shown later. The Department of State Development's goal to test the role of government

in cluster development is reflective of national and state policy on innovation and cluster development.

Table 1 Collaborative and institutional objects of activity and goals

	Collaborative object of activity	Object-oriented activity	Goal-oriented action
TasIT	Sustainable industry development	Industry potential	-Collaboration between industry partners -Encourage opportunities for local firms to win large projects -Keep state government work within the state
Intelligent Island		Industry development	-Develop good networking and entrepreneurial skills -Encourage export of products and services -Creation of commercial opportunities
Department of State Development		Industry development	-Multiple approaches e.g. • Technopark • New start-ups Commercialisation manager for University research • Test the role of government in cluster development

As explained previously, the *collaborative object of activity* is the presupposition for production, in this instance sustainable industry development. The *object of production* is what is produced. What is produced in collaborative activity changes quite rapidly, as shown in Table 2.

The Evolving Object of Production

Table 1 identifies the *collaborative object of activity*. Table 2, on the other hand, illustrates the evolution of the *object of production* of the collaborative activity.

Table 2: The evolving object of production

Timeframe	Object	
Early 2002	Object of production A	An Information Technology Cluster involving GIS, Antarctic, Southern Oceans, Fisheries, Oceanography Studies as an alternative to the Intelligent Island Bioinformatics Centre of Excellence
Mid-2002	Object of production B	A Science/Information, Communications Technology Industry Cluster
Late 2002–2003	Object of production C	Marine Science Information, Communications Technology Cluster
May 2003	Object of production D	Need for control Trading Cooperative to build on the information technology skills and Intellectual Property generated in Tasmanian Scientific Institutions
March 2004	Object of production E	To be the leader in the adaptation and commercialisation of ICT-related intellectual property generated within the Tasmanian marine science community, in other local scientific institutions and in the ICT private industry.

As the object of production evolved, the relations of collaborative activity changed. By following the object of production we see the evolution of the object of production from something related to Southern Oceans but relatively undefined, to a Marine ICT Cluster over the time period of nearly two years and a number of formulations. Having identified the object of collaborative activity and object of production it is then possible to analyse the ways in which contextual conditions mediated the collaborative activity of the evolving Marine ICT Cluster.

Ways in which Contextual Conditions Mediated the Collaborative Activity

The following section provides examples of how contextual conditions of mode of production, history, discourse and institutional arrangements mediated the collaborative activity.

Different discourses of cluster mediated relations of production within the collaborative activity. This was evident, in for example, in the differing consumption of discourses of cluster by the institutions involved and the subsequent distribution of resources to the evolving Cluster. For

example, the Department of State Development and Intelligent Island identified strongly with a discourse of cluster centring on commercialisation of products for global markets as illustrated in the following quotes:

> [Clusters are] an entity made up of a whole range of others that have got the ability to get things to market faster or value add to the businesses that they couldn't do separately …
>
> [For clusters to work] the market is the end … [it is necessary to have] the demand side and the supply side.
>
> Clusters provide some of the best opportunities to access external markets
>
> The Marine Cooperative needs to be more than industry players; you need to be thinking about your customers, your suppliers, and your research. I don't think we call this marine area a cluster because I don't think that we've got all of those players' involved (2004 interviews).

The language in these quotes suggests that those involved in clusters require skills and capabilities to commercialise products, and to market and export products. This concept of clusters suggests that commercialisation requires research, an appreciation of the intellectual property position, market studies, identification of the point of differentiation in the market, investors and a business development plan (Australian Institute for Commercialisation Ltd, 2002). This discourse of cluster was meaningful for the Department of State Development and Intelligent Island, but not for TasIT.

TasIT member firms in the Cluster Steering Committee understood cluster as a strategic entity. One respondent describes their view of cluster development as not being based on the production of 'widgets' (products to sell), but as 'trying to position ourselves in the market to be seen as the first point of reference for this sort of work'. The respondent goes on to say:

> Most business culture is about widgets. Widget people don't think strategically, they can't. They have spent all this time and energy and money getting this widget ready to go and they've got to flog … them (2004 interview).

The 'widget culture' as described by the respondent above assumes a manufacturing approach to the development of firms, that is, it must involve the production of goods – a product. The same respondent suggests that, rather than the information technology industry being an industry based on developing products for sale, it is:

> essentially a service industry, we fix problems. We don't actually create new goods in a way we solve problems, the problem usually exists we don't usually invent them…
> We're trying to broker a service, we're not trying to make a widget and sell it, we may make a widget and sell it as part of service development, the

> commercialisation of service is not a good it may not be part of it (2004 interview).

Cluster, as a means for making the most of possibilities within the environment in which firms are operating (Benneworth & Charles, 2001), is an important discourse of cluster for TasIT and its members. TasIT did their utmost to involve a range of research institutions, and larger firms. But contextual conditions such as the dominant discourse of cluster and the limited institutional arrangements, mediated the trajectory of the cluster.

Once the objects of production was to form a Trading Cooperative, the tensions between these two discourses contributed to the gradual withdrawal of Intelligent Island's and the Department of State Development from the Cluster Steering Committee. However, this withdrawal cannot entirely be accounted for by differences in discourses of cluster. Nor can these differences fully account for tensions such as differences in power relations at various times. The historical differences in interaction between the three institutions provide another part of the explanation for these tensions, as do the different institutional practices and arrangements between these institutions.

The Tasmanian IT industry at the time of the study was young, without well developed institutional arrangements, or a history of collaboration and the skills and language that support collaboration. The Department of State Development and Intelligent Island are significant participants in each other's communities of practice. At the time of the 2002 interviews TasIT was only on the periphery of this community, having only recently been included on the mailing list of the Department of State Development. Constributing reasons for these limited historical experiences and institutional arrangements included differences between bureaucratic government practices and private sector practices that is, different assumptions and norms illustrative of the multi-voicedness (Engeström, 1999) of collaborative activity. For example, the processes around the survey managed by the government institutions, with requirements for tendering processes and long timeframes, were not congruent with private sector timeframes and the need for quick decisions.

Access to the decision making of the Intelligent Island Board was difficult for TasIT. TasIT's perception of its own power and influence in relation to Intelligent Island was based on its historical experience with the Intelligent Island Board:

> One has to look at the Intelligent Island Board structure. We suggested that it needed to have strong industry and by that I mean private industry representation on it and it ended up having an independent Chairman from Fujitsu in Sydney…But then it has heads of three Government Departments of Tasmania and two people from the Federal government department, it has the Chancellor of the University and it has an academic, from the University. So it is academics and government, and there is one representative from the private sector and there are two politicians. One lone voice…has got nowhere (2002 interview).

‘One lone voice’, was indicative of the lack of access for TasIT, contributing to a lack of trust and credibility for TasIT. This contributed to limited participation in each other’s communities of practice, thus contributing also to the creation of less permeable boundaries and ‘boundary spaces’ between them. TasIT remained on the periphery of the boundaries of Intelligent Island and the Department of State Development, whereas these two latter institutions shared permeable boundaries through their overlapping discourses, bureaucratic practices (as a result of being established by State and Commonwealth government and administered by the Tasmanian State Government) and proximity of office area.

These different practices and expectations were part of different encoding practices (Lotman, 1990) getting in the way of a common language (Camagni, 1991). The limited historical collaborative experience and limited institutional arrangements in the state did not provide examples of successfully overcoming differences. Thus, the contextual conditions of history and institutional arrangements mediated the collaborative activity between these institutions. Multiple experiences of collaborative activity are important in aiding development of procedures for information flow, interpretation and diffusion (Simonin, 1999, p. 603).

The mode of production evident in the distribution of power through the division of labour, added to tensions between these institutions. The Department of State Development held power in terms of allocating funding and resources in relation to the workshop and survey tools. On the other hand, TasIT held a different form of power, the Cluster was initiated by them, and ultimately it was these members of the Cluster Steering Committee who would decide on the direction and processes of the developing Cluster.

Historical experiences contributed to an ‘us’ and ‘them’, insiders and outsiders (Stock, 1990) perception of each other. There was inadequate ‘socially shared, relationally responsive, perceptible understanding’ (Shotter & Billig, 1998, p. 25) between the government institutions and TasIT to further the dialogue.

Contextual conditions are embedded within collaborative activity, mediating the consumption and distribution of tools, and exchange between subject and object. This is evident in for example, the hegemonic discourse that the market is *the* organising factor and the link between information technology, the information economy, innovation, competition and global markets. Not only did these discourses contribute to the affordance of developing the Marine ICT Cluster, but they also direct policy formulation. Policy relevant to the evolving Cluster mediated access to (the distribution of) information about funding possibilities; government tendering out policies mediated not only different forms of consumption of the workshop and survey, but access to the formulation of these tools. This in turn mediated the trajectory of the collaborative activity through the object of production. The existence of multiple research institutions, a deep water port, proximity to the Southern Ocean, were important contextual conditions in mediating the initial object of production.

Conclusion

A powerful learning process can be developed through identifying the different voices of each institution and understanding the ways in which contextual conditions mediate these voices. Understanding the ways in which contextual conditions mediate collaborative activity is a process of analysing the social relations of production, namely consumption, distribution and exchange within the collaborative activity.

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