

**Measuring Relationships Within A Fine Art Cluster
Under Conditions Of Dislocation**

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Abstract

Business relationships and activities will be mapped to establish the functional characteristics of the fine art industry cluster of which the National Gallery of Victoria (NGV) has long been the dominant figure. Many of the core activities of the NGV have been severely disrupted between 1999 and 2003 due to refurbishment. This circumstance has made it possible to examine and determine the effects of dislocation of the dominant member on the way a cluster functions. This research will provide information on how fine arts businesses, including some that are competitors, interrelate, and how and to what extent a previously dominant member can reinstate its position after a period of dislocation.

This research project employs a longitudinal design so that cluster functioning and level of innovation can be compared before, during, and after disruption of the NGV's core activities. This circumstance provides a unique opportunity to identify groups of firms with similar innovation patterns and consequent strategic types (personality), test conflicting expectations arising from alliance capitalism and market capitalism models and to examine the assumption that the strategic type (personality) of the cluster, to which a firm belongs, has a bearing on the innovative status of the cluster and its consequent adaptability to change in turbulent environments.

Key words: dislocation, innovation, inter-relationships, cluster, measurement.

Preamble

For the purpose of this paper a cluster has been defined as a complex system capable of initiating a synergetic process where interconnected organisations and associations are linked by commonalities, complementarities and rivalry.

The interconnections between cluster members can be explicit and implicit, that is, as informal social systems or as formal structures. A second aspect of a cluster is that of proximity which may be geographic or functional. This connectivity and synergy transforms the local experience of each member where they can be expected to define their relations' vis-à-vis rivals and with markets.

Introduction

The National Gallery of Victoria (NGV) has simultaneously been the dominant member of industrial and regional fine art clusters in Victoria, as well as a powerful figure in the national fine art industrial cluster. Closure of the NGV for renovation, and as a consequence scaled down operations for a period of four years (1999-2003) before reopening, provides a unique opportunity to study the effect of dislocation of the dominant player, on the way the fine art cluster in Victoria operates. This investigation will examine inter-relations between members of the cluster over three stages of dislocation, that is, before, during, and after disruption of the NGV's core activities.

Innovation is considered one of the key factors underlying growth and hence networks of innovation are the rule and the result of complex interaction that involve multiple actors (OECD, 1999a). Hence in this respect, it is valuable to analyse innovation from a "multi-actor" or macro-level perspective, as reflected in the cluster, rather than purely from an individual (micro level) firm basis (Dodgson and Bessant, 1996:20).

Viewing a group of companies and institutions as a cluster highlights opportunities for co-ordination and mutual improvement in areas of common concern without threatening or distorting competition or limiting the intensity of rivalry (Porter, 1998a). Porter (1998b) argues that, because innovation processes are institutionally embedded, the co-existence of competition and domestic rivalry accelerates the pace of innovation and rate of knowledge diffusion and spurs dynamic improvement. Porter is careful to argue that competitive advantage can be developed only as long as co-operation enhances rivalry ... Porter's analysis thus addresses 'conditions both for competition and co-operation' (Staber, 1996b).

The co-existence of co-operation alongside competition is a phenomenon referred to by Dunning (1997) as "alliance capitalism". Co-operation and collaboration in close proximity provides a spur to innovation, while competition within a cluster, due to increasing returns (Arthur, 1989), will be an increasing sum game where networks of relationships are greater than the sum of its parts (Achrol, 1997; Porter, 1998a). In contrast, the neo-classical model of

the firm would see close proximity in product or geographic space as a stimulus for competition, with competitive moves and new entries reducing industry margins and firm profitability. The expectation from an alliance capitalism framework is that the exit of a major player will damage all existing firms, while the outcome anticipated from the neo-classical market position is increased entry and/or improvement in the prospects of current participants.

Projects aim

The aim of this research is to analyse the levels of innovation, or “innovative activity” (De Bresson 1996) during the process of change within the fine art cluster and determine the effect of dislocation of its key player, on how the cluster operates. The analysis will focus on innovation activities and determine if inter-relationships between members change during the three stages of transition. A continuum of innovative activities, will offer an opportunity to compare the effect of dislocation on the innovative achievements and consequent innovative status (Spielkamp and Vopel, 1999) of the cluster and its members during the three stages of transition.

Essentially this paper is concerned with two issues:

1. The effect of dislocation of a key player on the level of innovative activity within the fine art cluster;
2. The manner in which the inter-relationships between cluster members respond to change in cluster dynamics during dislocation of its key player.

The research

The goal of this research is to contribute to improving the understanding of innovation as a driver of economic growth and change, focusing on the firms within the fine art cluster (micro level). Hauknes (2001:157) states that any study of a firm and its innovative behaviour “...must be based on an understanding of the relevant industry and market dynamics and the firms’ perceptions of these”. A firm’s perceptions of market dynamics, and each other, determine how members position themselves within the cluster and define relations with each other by staking out positions, such as claims about the markets they are serving, the goods and services they produce, and the technologies they employ (Baum, 1997). Porter (1990), re-emphasises the issues of positioning within a cluster by arguing “how these firms choose to position themselves (within the cluster), their home nation, and elsewhere, is an important instigator for change”.

The level of co-operation, collaboration and rivalry, within the cluster, can also determine how members define themselves and their relationships with each other. Hence, it is important that this study does not limit itself to measuring entry, exit, innovation and incumbent growth during the transition stage of relocation and dislocation of the NGV, but to also measure the levels and types of relationships between cluster members and how they are

positioned within the cluster. By analyzing impacts and repercussions of disruption on relationships with the cluster and externally, this study will help determine the effect of dislocation of the dominant player, the change in inter-relationships between members and the way the fine art cluster operates, such as the level of innovative activity and its consequent status in terms of innovation.

It would follow that by investigating the firm's innovative activity, each member's organizational structure also need to be considered, as innovative activity, level of 'innovative status' (Spielkamp and Vopel, 1999), and organizational structure are key variables of a firm's propensity to innovative decision-making and consequent ability to become 'drivers of change'. The focus from a micro level offers insight into the firm's ability to perform from a local economic framework, that is, from both production and social systems, during the three stages of transition.

As cited by De Bresson (1996) "... there can be no proof, nor is it possible to disprove – or falsify – a theoretical hypothesis when we examine complex, open systems with interacting variables ... (instead) we must limit our intellectual ambitions to reducing uncertainties. In order to do so, we can make theoretically and empirically plausible the existence of limiting factors to innovative activity." In this current research, it is argued that the limiting factor to innovative activity is the dislocation of the key player within the fine art cluster.

This current circumstance of dislocation of a key player will provide a unique opportunity to test conflicting expectations arising from alliance capitalism and market capitalism models, issues of the social context of competition and relevance to organizational structure, behaviour patterns of decision makers and structural pre-conditions that may determine the success of innovative clusters.

It is hypothesised that on re-entry into the cluster, and after organizational restructuring into two separate entities:

- The NGV International (NGVI) in St Kilda Rd will adapt their production and organizational capabilities to the requirements of the common objectives of the international industrial cluster. This organizational restructuring will broaden the cluster boundaries; reposition itself as an international player, however, remaining the same strategic type (i.e., Defender).
- The NGV Australia (NGVA) at Federation Square will simultaneously strengthen its national and Victorian links, dominating the industrial and regional fine art cluster in Victoria, as well as acting as a powerful figure in the national fine art industrial cluster. This organizational restructuring will transform the re-branded entity into a new strategic type (ie Analyser / Prospector) as well as blurring its boundaries to emerge as a member of the entertainment and leisure cluster, thus improving the network prospects and innovative status of the cluster.

The key question for research

This research proposes to identify the effect of dislocation of a major player on functioning with the fine art cluster. The key question to be asked is:

Does dislocation of the dominant player affect the way the fine art cluster operates (i.e., level of innovation), and change the inter-relationships between members?

The NGV's temporary dislocation is hypothesized to be disruptive to the overall cluster operations and will change inter-relationships between members, hence solving, or at least investigating the key problem for research is better understood if it is developed as three separate sub-problems:

- The first is to determine boundaries, map interactions, positioning and determine strategic types (personality) of the cluster and its members
- The second is to analyse impacts and repercussions of disruption on relationships within the cluster and externally and determine if external variables such as demand conditions influence a cluster's collective strategic type (personality)
- The third sub-problem is to measure entry, exit, innovation and growth to analyse competitive dynamics in terms of alliance capitalism and neo-classical models.

Methodology and paradigms

Initial stakeholder identification will result from preliminary discussions with industry partners, cultural agencies, government bodies, commercial galleries and educational institutions. Data collection includes an in-depth interview using an open-ended and semi-structured format combined with a structured questionnaire survey. Interview and questionnaire analysis will compare levels of interaction, issues of change and innovative activity during each stage of the three transitional phases (that is, pre-dislocation, during dislocation and upon re-entry) in order to:

1. Prove or disprove each hypothesis
2. Answer the research question by establishing if the NGV's dislocation has had any effect on the fine art cluster.

The methodology undertaken at each of the three phases include:

1. Mapping the fine art cluster to determine membership, inter-relationships and positioning.
 - Porter's (1998a) four step method (see appendix 1) will identify the constituent parts of the fine art cluster;
 - Following the identification of the cluster, the cluster structure, detailed in a cluster map, will illustrate the components, their relationships and interactions;

- Interview and survey analysis will be used to determine:
 - Cluster boundaries
 - How members position themselves within the cluster
 - Classification of the cluster and its members' innovative activity according to Rosenfeld's (1997) classification (see appendix 2) and Miles and Snow's typology (1978) (see appendix 3).
- 2. Tracking formal organizational structures and informal networks of cluster members to determine any change.
 - Using organizational plans establish if there is any internal formalised restructuring (endogenous development) that may indicate organisational change / change of personality or strategic type (Miles and Snow, 1978) of cluster members
 - Analyse interviews and surveys to track changes in:
 - Formal and informal cluster networks
 - Personality or strategic type (Miles and Snow, 1978) of the cluster
 - Measure entry, exit and incumbent growth in terms of trends in demand, cluster membership and positional advantage.
- 3. Verifying competitive dynamics and 'innovative status' (Spielkamp and Vopel, 1999), that is, the level of innovation, research and development (R&D) and accumulation of knowledge.
 - Measure innovative status of cluster using Spielkamp and Vopel's (1999) 'Innovative Cluster Formula' (see appendix 4)
 - Interview and survey responses will offer an opportunity to compare:
 - Levels of interaction during transition, and its relevance to innovative activity and achievement (i.e., innovative status)
 - Levels of competitive dynamics of the cluster in terms of alliance capitalism and neo-classical models

The paradigms used to evaluate the effect of dislocation during transition, consist of:

- Rosenfeld's (1997) classification of a cluster (see appendix 2)
- Miles and Snow's (1978) typology (see appendix 3)
- Spielkamp and Vopel's (1999) measurement of an innovative cluster using the 'Innovative Cluster Formula' (see appendix 4)
- The 'Co-opetition Continuum Scale' – a neo-classical, constructive co-operation and alliance capitalism paradigm, (see appendix 5). Included in this scale is Kamann's (Bergman et al., 1993,5) continuum of possible power structures in networks, ranging from an egalitarian structure to complete dependency and dominance.

By summarising the innovation and system behaviour of a number of firms within the fine art cluster, groups of firms with similar innovation patterns, classification (Rosenfeld 1997) and

consequent strategic types (Miles and Snow 1978) will be identified. Measuring members' innovative status (Spielkamp and Vopel, 1999), extension of services, attitudes of current members to new entries, member's view of the dislocation of NGV, levels of skill exchange (tacit knowledge) and knowledge transfer, response to exits and any incumbent growth would also be undertaken.

The 'Co-opetition Continuum Scale' will be used to measure competitive dynamics as well as possible power structures in the network. The levels of co-operation and competition (and a combination of the two) and possible power structures will be measured to assist in analysis in terms of the alliance capitalism and neo-classical models. A dominant player would consume more 'synergetic surplus' of the cluster's network, and shape and organize the future development of the network to its advantage. Dominance would fall under the neo-classical model, while an egalitarian structure would see players with common objectives fitting the alliance capitalism model (Bergman et al., 1993,5).

The success of the outcome of this investigation will be measured in its usefulness for prescription, as a guide to action, in future restructuring that incorporates the effects of temporary dislocation of a key player within a cluster.

The problem for research and its three sub-problems

This research proposes to identify the effect of dislocation of a major player on functioning within the fine art cluster. The methodology and paradigms outlined above have been developed in the following three sub-problems, each stating its hypothesis and relevant action.

First sub-problem – mapping the cluster & determining boundaries, classification and strategic type

Hypothesis 1 Prior to dislocation the NGV cluster acts as a working cluster that is, a relatively complete system with specialised support and considerable social capital.

Action 1 Map social networks and interactions to determine who belongs to the cluster, positioning and depth of inter-relationships.

It could be argued that the Victorian fine art cluster would fit into the "animated" or "working" cluster, as they are "relatively complete systems with specialised support and considerable social capital" (Rosenfeld 1997, 21). So the next question is, what happens when the key player who is significant in its R&D capacity and cross boundary research disappears from the leadership / key role within the cluster?

Hypothesis 2 During dislocation, the fine art cluster will act as a latent cluster that may have the production system elements in place but lack the social system necessary to diffuse information and facilitate innovative activity.

Action 2 Identify and classify the cluster and its members according to Rosenfeld's classification (Rosenfeld 1997).

According to Spielkamp and Vopel (1999), firms innovating at a certain level, that is, it's innovative activity (De Bresson, 1996) or innovative status (Spielkamp and Vopel, 1999) use a portfolio of information and knowledge transfer strategies that cannot simply be transferred to firms that are not (yet) innovative. Hence, it would be opportune to hypothesise that:

Hypothesis 3 The personality or strategic type (Miles and Snow 1978) and innovative activity / status of a firm determines the personality or strategic type and innovative activity / status of the cluster to which it belongs.

Action 3 Identify and classify the cluster and its members according to Miles and Snow's typology (Miles and Snow, 1978).

This hypothesis directly links with German studies that suggest that 'innovative clusters' have a significant correlation between the innovative behaviour (innovative activity / status) of a firm and the industry in which it belongs (Spielkamp and Vopel, 1999).

First sub-problem – action and methodology

The boundaries of the Victoria-based fine art cluster will initially be identified using Porter's four steps (Porter, 1998a) (see appendix 1). To overcome any oversight in capturing the important actors and as well as the linkages across industries, a detailed interview protocol followed by interview analysis will be undertaken. Actors within the fine arts and related businesses, experts, as well as the market served by the cluster will then be interviewed and surveyed.

Following the identification of the cluster members, the cluster structure, detailed in a cluster map, will illustrate the cluster components and their relationships. The use of cluster maps will conceptualise the depth and breadth of relationships between cluster members. Cluster maps can guide new economic development strategies, and as detailed by Austrian (2000, 97), is a "visual schematic that describes the different components of a cluster and how the components relate to each other ...". A cluster map illustrates the cluster's structure, shapes the way the cluster is perceived, and takes into account the synergies between the cluster's different components.

Evaluation of innovative activity/status of cluster members will be analysed and compared. The cluster and its members would then be classified according to Rosenfeld's (1997) classification and Miles and Snow's (1978) typology. This analytical phase will offer an insight into the fine art cluster's character or personality, its structure and what drives individual companies to innovate and upgrade.

Second sub-problem – analysing disruption, impacts & repercussions

Technology and know-how transfer is a strategic function of a major player, such as the NGV, which tend to have more formal channels of communication. As a major player, the NGV can lead major changes within the cluster as large companies use the innovation system more intensively than do small, medium enterprises (SMEs) which prefer “informal communication with local agents ... acting spontaneously and on an operative level” (Spielkamp and Vopel 1999,108). The circumstance of the NGV's restructure will provide a unique opportunity to test the assumption that:

Hypothesis 4 When there is an organizational change / change of personality of a key protagonist (due to relocation and downsizing), there will either be a shift in personality of the cluster.

or

Hypothesis 5 When there is an organizational change / change of personality of a key protagonist (due to relocation and downsizing), a cluster's boundaries will change to create a new cluster that reflects its 'innovative status' (Spielkamp and Vopel, 1999), that is, reflecting the level of innovation, research and development (R&D) and accumulation of knowledge.

In addition to engendering a collective competitive advantage as indicated in the alliance capitalism model, cluster creation can often bring about a transformation within the individual member enterprises “aimed at adapting their production and organizational capabilities to the requirements of the common objectives” of the cluster (Ceglie et al., 1999, 281; Ceglie and Dini 2002, 17). However, the opposite is also true, Ceglie et al also state that “enterprise restructuring can greatly contribute to improving network prospects” of the cluster (1999, 281).

This research project examines the impact on patterns of activity and inter-organisational relationships of this disruption to the fine art cluster of which the NGV has long been the dominant figure. Will the NGV's organizational structure change during this period of dislocation? If so, will the cluster structure transform to accommodate the NGV's new strategic type? Will the NGV be able to re-establish its dominant position within the new cluster structure following re-entry into the cluster?

Addressing these questions will enhance understanding of social networks and inter-firm collaboration which include issues of embeddedness and its personality and social context (Gulati 1999; Gulati et al., 2000), relational capital (Kale et al., 2000), as well as linking strategy to internal organizational structures and processes with Miles and Snow's (1978) strategic typology and speculate the relevance to the cluster's organizational structure type.

Second sub-problem – action and methodology

Action 4 *Conceptually understand the dynamics of organisational structure of individual members as well as the cluster strategic type*

Action 5 *Analyse impacts and repercussions of disruption on relationships and determine if there is a relationship between dislocation and:*
(i) Internal organisational restructuring
(ii) The likelihood of a cluster's shift to a collective strategic type

Third sub-problem – measurement & analysis of competitive dynamics

Fischer (1999) states that innovation processes have an evolutionary character and develop over time. The processes through which innovations emerge are complex and incorporate knowledge generation and spillovers, they are also characterized by interactive relationships involving research, technology, production and the market. These interactive relationship network prospects of the cluster can be highlighted by the depth of relational capital (reputation, mutual trust and know-how transfer) cited by Kale et al. (2000) as well as the level of embeddedness (Gulati, 1998) (cultural/social context and personality) of the inter-dependent firms. The inter-relationships between the fine art clusters' members play a crucial role in how the fine art industry is perceived from both an international and national perspective and would appear to work from the alliance capitalism model, in that collaboration works hand-in-hand with competition, which is a spur to innovative activity.

Apart from measuring entry, exit and incumbent growth during the three stages of transition, this research project will need to test the assumption that the fine art cluster works from the alliance capitalism model. It will also need to verify if dislocation of the NGV affects the way the fine art cluster operates (ie level of innovation) and if the inter-relationships between members changes upon re-entry.

Hypothesis 6 *The fine art cluster operates as an alliance capitalism model, rather than a neo-classical model.*

It is hypothesized that competition within the cluster collaborate and therefore act as a catalyst for innovation. Under the alliance capitalism model, the exit of a major player is detrimental to the cluster. Upon re-entry of the NGV, it is hypothesized that the cluster would continue to act as a working cluster (Rosenfeld, 1997) but within different boundaries, that is,

collaborating on an international platform and including peripheral players such as tourism and entertainment cluster members within its boundaries.

This research project will then be able to examine issues of innovation and strategic types to determine the cluster characteristics over time, while establishing if Ceglie et al's statement that "organizational restructuring can greatly contribute to improving network prospects" (1999, 281) of the cluster is relevant. Hence, the following hypothesis will need to be tested.

Hypothesis 7 If an organisation changes its strategic type or level of innovation; it will leave the cluster and become a new actor in a more compatible cluster.

or,

Hypothesis 8 If an organisation changes its strategic type or level of innovation, and has strong innovative status, it will lead the cluster to change its own (cluster) character or strategic type.

That is, it may become an innovative cluster (IC) (Spielkamp and Vopel, 1999) ensuring that the organisation's level of innovation can be transferred to members that use a similar portfolio of information and knowledge transfer strategies.

Finally, upon re-entry into the cluster and after organizational restructuring into two separate entities, it is hypothesized that:

Hypothesis 9 The NGV International (NGVI) will adapt their production and organizational capabilities to the requirements of the common objectives of the international industrial cluster. This organizational restructuring will broaden the cluster boundaries; reposition itself as an international player, however, remaining the same strategic type (.ie., Defender).

Hypothesis 10 The NGV Australia (NGVA) at Federation Square will simultaneously strengthen its national and Victorian links, dominating the industrial and regional fine art cluster in Victoria, as well as acting as a powerful figure in the national fine art industrial cluster. This organizational restructuring will transform the re-branded entity into a new strategic type (ie Analyser / Prospector) as well as blurring its boundaries to emerge as a member of the entertainment and leisure cluster, thus improving the network prospects and innovative status of the cluster.

Porter (1990) suggests that clusters are often, but not necessarily always, localized within a country. Globalisation and the international disposition of the NGVI would heighten the necessity of an international industrial cluster.

Third sub-problem – action and methodology

Action 6 *Measure entry, exit, innovation and incumbent growth*

Action 7 *Measure innovative status of the cluster using the ‘Innovative Cluster Formula’ (see appendix 4)*

The first step of the innovative cluster analysis is to investigate the innovation and system behaviour of a number of firms that belong to the fine art cluster. According to Spielkamp and Vopel (1999) three main factors form an innovative cluster, that is:

- The innovative status of the cluster (*inno*)
- The networking activities or knowledge transfer channels (*know*)
- Information and management behaviour of the firm, that is, information sources important to an enterprises’ innovative activities (*info*)

The analysis will also need to examine variables not directly linked to the innovation process, such as size (*size*) (Acs and Audretsch, 1990) and industry (*indu*) characteristics (that is, co-operative, competitive and co-opetition behaviour), to determine the fine art clusters’ propensity to be classified as an innovative cluster. Hence, by summarising the innovation and system behaviour of a number of firms within the fine art cluster, we are able to identify the groups of firms with similar innovation patterns and consequent strategic types as detailed by Miles and Snow (1978).

Action 8 *Analyse and determine the competitive dynamics of the cluster using ‘Co-opetition Continuum Scale’, (see appendix 5) in terms of alliance capitalism and neo-classical models by evaluating:*
(i) Issues of power including dependency, dominance and egalitarian relationships
(ii) Levels of competition, co-operation and co-opetition

The ‘Co-opetition Continuum Scale’ will help to analyse and identify:

- The levels of co-opetition, co-operation and competition within the cluster
- Determine possible power structures
- Competitive dynamics in terms of the alliance capitalism and neo-classical models

The 'Co-opetition Continuum Scale' has been developed for:

- Stressing the network of actors and their propensity to co-operate and collaborate in generating, diffusing and using knowledge, expertise and innovation while simultaneously competing.
- Indicating groups of firms with similar innovation characteristics that belong to the cluster
- Identifying possible power structures of the firms within the fine art cluster, that is, ranging from an egalitarian structure to complete dominance and dependency.

Measuring the way the fine art cluster operates (ie level of innovation) and interrelationships between members would consist of:

Table 1 Individual firms: What to Measure?

Measurement variables relevant to individual members of a cluster	
Innovative status	Continuity of innovative activities
Knowledge transfer channels	Innovative capacity
Information transfer channels	Accumulation of knowledge
Management behaviour	Visitation rates
Product development	Skill levels
Publications	Sponsors / alliances / affiliated bodies
Research and Development performance	Extension of services
Size / Organisational structure	Response to exits, new entries
Industry characteristics	Growth
Positioning	Trust
Strategic type (personality)	Reputation
Acquisitions / loans	Visitation rates

Table 2 Cluster: What to Measure?

Measurement variables listed above	New variable relevant to a cluster
Innovative status	Continuity of innovative activities
Knowledge transfer channels	Cultural embeddedness
Information transfer channels	Social embeddedness
Product development collaborations	Cluster boundaries
Size / Organisational structure	Relational capital
Industry characteristics	
Positioning	
Strategic type (personality)	
Continuity of innovative activities	
Innovative capacity	
Accumulation of knowledge	

Conclusion

This research project offers the opportunity to employ a longitudinal design so that cluster functioning and level of innovation can be compared before the NGV closed for refurbishment, during the period of dislocation, and over the 18 months following re-opening of the Gallery.

This research project offers an opportunity to test the assumption that the strategic type or personality of the cluster, to which a firm belongs, has a bearing on the innovative status of the cluster. Rosenfeld’s (1997) cluster types and Miles and Snow’s (1978) typology will be used to try to define the strategic type of this cluster personality, reflecting its adaptability to change in turbulent environments.

The outcome of this research is to understand the way clusters work and how they can become more productive through innovation and change. Using the results in conjunction with current theorizing about how clusters function, this study will help set a precedent for organisations undergoing change, and help them develop a model and prepare effective strategies that incorporate the effects of temporary dislocation.

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Appendix 1 - Identifying the Cluster

Porter (1998a) outlines steps in identifying the constituent parts of a cluster. These four steps include:

1. Starting with a large firm or concentration of like firms and then looking upstream and downstream in the vertical chain of firms and institutions.
2. Look horizontally to identify industries that pass thorough common channels or that produce complementary products and services. Additional horizontal chains of industries are identified based on the use of similar specialized inputs or technologies or with other supply-side linkages.
3. After identification of a cluster's industries and firms isolate the institutions that provide it with specialised skills, technology, information, capital, or infrastructure and any collective bodies covering cluster participants.
4. The final step is to seek out government or other regulatory bodies that significantly influence participants in the cluster.

Appendix 2 - Rosenfeld's (1997) classification of cluster types

Rosenfeld (1997,1) defines a cluster as "lateral inter-firm relationships" and argues that a new framework for understanding clusters should be expanded from the conventional employment and market-based criteria to a framework that treats local economies as both production and social systems.

The local social system affects the ability of the cluster to produce synergy. Hence, could be classified as a healthy cluster or as defined by Rosenfeld (1997, 21) an animated or "working" cluster that "is relatively complete systems with specialised support and considerable social capital."

Rosenfeld (1997, 11) illustrates three types of clusters:

1. Working (Over-achieving cluster)
2. Latent (Under-achieving cluster)
3. Potential (Wannabe) cluster

Appendix 3 - Definitions and Issues to Miles and Snow Typology

Miles and Snow (1978) propose four strategic types to describe organisations and their behaviour. This typology consists of:

1. Prospector
2. Analyser
3. Defender
4. Reactor

Slater and Olsen (2000) state that:

- *Prospectors* continuously seek to locate and exploit new product and market opportunities (2000, 814). They seek customers who are willing to buy new products that utilize cutting-edge technologies. To accomplish this, prospectors require a sophisticated and knowledgeable sales force (2000, 817).
- *Defenders* attempt to seal off a portion of the total market to create a stable set of products and customers.
- *Analysers* occupy an intermediate position between the two extremes by combining the strengths of both the *Prospector* and *Defender* to cautiously but quickly (2000, 816) follow *Prospectors* into new product-market domains while protecting a stable set of products and customers. Because *Analysers* place great emphasis on maintaining a base of traditional customers while simultaneously exploiting new market opportunities (Slater and Olsen 2000, 817). Miles and Snow (1994) emphasis tends to highlight the general value of linking strategy to internal organisational structure and processes.
- *Reactors* do not have a consistent response to the entrepreneurial problem.

Empirical research on the business strategy-marketing competency relationship has found that *Prospector* and *Analyser* organisations place greater emphasis on marketing activities than do *Defender* organisations and that *Prospector* organisations emphasize marketing activities more than *Analyser* organisations.

Appendix 4 - Spielkamp and Vopel's (1999) innovative cluster (IC)

According to Spielkamp and Vopel (1999) an innovative cluster is a function (f) of three factors.

- The innovative status of the cluster (*inno*)
- The networking activities or knowledge transfer channels (*know*)
- Information and management behaviour of the firm, that is, determine information sources important to an enterprises' innovative activities (*info*)

To determine the fine art clusters' propensity to be classified as an innovative cluster

1. The first step of the innovative cluster analysis is to investigate the innovation and system behaviour of a number of firms that belong to the fine art cluster.
2. The second step is to examine whether an innovative cluster is sensitive to variables of Size (*size*) and Industry (*indu*) characteristics not directly linked to the innovation process.

The formula of an Innovative Cluster (IC) is as follows:

$$\text{Innovative Cluster (IC)} = f \{ \text{Inno} \setminus \text{Indu} \} \\ \{ \text{Know} \setminus \text{Size} \} \\ \{ \text{Info} \}$$

Appendix 5 - Co-opetition Continuum Scale.

The first part of this model consists of a *neo-classical, constructive co-operation and alliance capitalism paradigm*. The objective of this scale is to identify an overall summary (personality) of the cluster, that is, measure individual cluster members to determine the collective cluster type. Definitions, expectations and predictions of each element are detailed below:

- 1. Co-opetition:** The co-existence of co-operation alongside competition, where competitive advantage can only be developed if cooperation enhances rivalry; where close proximity spur innovation...networks of r/ships are greater than sum of parts.
Expectation: Exit of major player will damage all existing firms
Prediction (P1): On re-entry into cluster, more robust “working cluster” due to restructure (operational and marketing)
Increased innovation in individuals and collective (cluster)
- 2. Co-operation:** Knowledge spillovers and exchange of information, rivalry limited, ‘complementors’ in creating the market
Expectation: Exit of major player will limit market potential
Prediction (P2): On re-entry into cluster, stronger ‘strategic innovation’ among members, repositioning as ‘complementors’ rather than competitors, with stronger network linkages... networks of r/ships are greater than sum of parts.
- 3. Competition:** Exit of player stimulates competition, with competitive moves and new entry reducing industry margins and firm profitability
Expectation: Increased entry/and or improvement in prospects of current participants
Prediction (P3): On re-entry into cluster, re-positioning of players, decline in numbers, innovation levels do not increase

The second part of this model consists of the *egalitarian and dominance continuum scale*. The objective of this scale would be to identify possible power structures in a network, that is, an organisation with an egalitarian structure as opposed to a complete dominance and dependency structure.

The ‘Co-opetition Continuum Scale’ will be used to measure of competitive dynamics as well as possible power structures in the network. The levels of co-operation and competition (and a combination of the two) and possible power structures will be measured to assist in analysis in terms of the alliance capitalism and neo-classical models. A dominant player would consume more ‘synergetic surplus’ of the cluster’s network, and shape and organize the future development of the network to its advantage. Dominance would fall under the neo-classical model, while an egalitarian structure would see players with common objectives fitting the alliance capitalism model (Bergman et al., 1993:5).