

The impact of timing in innovation management

Ronald C Beckett¹, Andrew O'Loughlin²,

¹ Swinburne University of Technology, Cnr Wakefield & Williams Streets, Hawthorn, VIC 3122, Australia.

rcb@reinvent.net.au

² La Trobe University, Plenty Road & Kingsbury Drive, Bundoora, VIC 3086, Australia.

a.oloughlin@latrobe.edu.au

Abstract. An innovative idea launched in the wrong place at the wrong time may not deliver the outcomes hoped for. Based on 55 empirical studies, Bowen, Rostami and Steel (2010) suggest 'timing is everything' if innovation is to enhance organisational performance, but there is also a need to understand contextual factors. The paper presents a theoretical model representing the interaction of idea, place, resources and temporal factors that draws on the Ancient Greek notion of Kairos linking events in time and timely action. Longitudinal studies of four intermediary organisations intended to enhance SME innovation capabilities are compared at different stages in their evolution. The cases highlight the context-sensitive nature of innovation: an idea that has been successfully implemented in one place at one time may not be successful at another place or another time.

Keywords. Innovation; creativity; background rhythms; place; mind-set; idea; resources; infrastructure; life-cycle; timing; Kairos.

1 Introduction

Is timing important in innovation management? The volume of related literature suggests the answer is yes, but in a number of different contexts. A Google Scholar search using the term timing indicated 3.5m hits, some being concerned with timing in technological and biological process. Combining timing and business indicated about 1.9m hits. The timing and innovation combination indicated 670,000 hits. The implication here is that timing is important in innovation, but even more so in relation to other business activities. The most cited articles covered matters of research, development and diffusion (Reinganum, 1989), economics (Freeman, 1982), technology adoption (Farzin, Huisman, and Kort, 1998) and search timing (Katila and Chen, 2008). Combining timing, business and life-cycle yielded 125,000 results, with the most frequently cited articles covering matters of product life cycle (Day, 1981), entry, exit and growth over the product life cycle (Klepper, 1996), consumption over the life-cycle (Attanasio and Browning, 1993), and organisation life cycle stage influences (Dodge and Fullerton, 1994). A search of articles published in the journal *Technology Forecasting and Social Change* that is concerned with background rhythms yielded 580 hits, with the most frequently cited articles being concerned with the interaction between successive generations of technology (Mahajan and Muller, 1996), technology adoption across countries (Dekimpe, Parker and Sarvary, 2000) and socio-technical interactions (Verbong and Geels, 2010). The implication is that we need to

consider a multiplicity of contextual factors when researching matters of timing.

In the context of social change, articles in the popular press cite French author and politician Victor Hugo's observation that "you can resist an invading army; you cannot resist an idea whose time has come" (e.g. Economist, 2009). Scientists may refer to an idea whose time has come when a new technology is mature enough to match an application opportunity (e.g. Yang and Giannakis (2004) - ultra-wideband communications). Others make reference to time windows where there is a transient opportunity to adopt a particular technology or introduce a social change (e.g. Perez and Soete, 1988; Kemp, 2001). Oinas and Malecki (2002) suggest that the application of a technology may emerge in different ways in different places, resulting in differing regional innovation eco-systems. The notion of emergence associated with place, technology and timing is implied here.

Bowen, Rostami and Steel (2010) suggest that in managing innovation "timing is everything". Serial entrepreneur Bill Goss (Goss, 2015), CEO of Idealab explored factors influencing the success or failure of some 100 start-up companies promoting an innovative idea, and found that issues of timing - being in the right place at the right time had a greater influence on success than the requisite great idea/great team combination. Benedetto (1999) made similar observations, considering company, competitor and customer influences. Welter (2011) noted that business conditions influencing an entrepreneur may change dramatically from one time and place to another. Watts and Porter (1997: 26) suggest: "Successful innovation relies on many variables, including the technology's characteristics, the fit between the innovating firm and the technology, familiarity of the firm with the market and associated infrastructure, market forces, the economic climate and resource commitments, other socioeconomic factors, and institutional actions or interactions". The notion of interaction in a complex socio-economic system is implied here.

What we take from the foregoing is that getting the timing right in implementing a particular idea is contingent on a number of contextual factors such as accessible resources and 'place' characteristics; but how these factors work together may not always be considered. We suggest that whilst there are numerous single-factor studies (e.g. establishing innovative places, establishing innovation infrastructure) and two-factor studies (e.g. time and technology interaction) there are few multi-factor studies considering the interaction of place, idea, resources and time, and this is our focus in this paper

Ancona, Goodman et al (2001) suggested the use of time as a research lens in studying organisational dynamics, and we adopt this approach. In the paper we are exploring the research question: *What innovation contextual factors condition an ability to explore and exploit windows of opportunity?* We present and utilise the main contribution of the paper - a theoretical multi-factor interaction framework drawing on an Ancient Greek idea that is developed in the next section.

Our focus is on managing planned or emergent windows of opportunity to progress an innovation through development and deployment stages and beyond. A literature review of temporal factors impacting innovation is presented, and a life-cycle mapping framework is presented. We apply our theoretical frameworks in an extended analysis of four longitudinal case studies of successful and partially successful innovation intermediary organisations. Findings from the cases and observations about our

framework are subsequently compared with the work of others in a discussion of the impact of timing in innovation management.

2 Drawing on an Ancient Greek concept of time

The Ancient Greeks described two notions of time. Chronos – linear, divisible time that we use as a management tool for coordinating activities. We focus on precise time intervals, but the concept has its foundation in cyclical astronomical events. Days are associated with the spinning of the earth and years with the journey of the earth around the sun. The other Ancient Greek notion – **Kairos, is about events in time stimulating moments of enlightenment and timely action.** It is less frequently used as a management tool, but we explore its utility here.

In a book on the Future of Innovation (von Stamp and Trifilova, 2009), a Nokia-Siemens network manager observed that an innovation may emerge too early or too late to meet a need/want and refers to the notion of Kairos – an opportune moment in time where action leads to impact when the conditions are right. One example of a kairotic moment given in the general literature is injecting a game-changing thought into a debate at just the right time. Another is the moment a hunter releases an arrow having positioned himself to be able to access his prey and having the right tools and skills to use them (e.g. Krause, 1996). Coessens (2009) refers to kairos as framing matters of timing in an artistic performance linked to the background dynamic environment. But if the orator has not framed the idea to inject into the debate, or the performer does not have the requisite skill, or the hunter does not have the appropriate equipment (resources) there is no impact from simply being in the right place at the right time.

In considering some matters of context, Dunphy et al (1996) describe an “innovation funnel” where the conjunction of several factors supports innovation: macro factors (technological pre-requisites and sociocultural tendencies), regional factors (material, human, and institutional infrastructures), and micro factors (the nature of the particular industry and firm, management attitudes and standards supporting innovation diffusion). Czarniawska (2004) argues that the interplay of kairotic and chronological timing needs to be studied in organizing. She observed that (p779) ‘organisation studies’ usually denotes research focused on one or more of the following study objects: places (organisations), people (individuals or groups), issues, and events, but she suggests their interaction should be considered.

The concept presented in this paper draws together a conjunction of place, idea, resources and timing. We contend that a wider understanding of Kairos as a concept can help managers and businesses better comprehend the processes involved in decision-making within the context of innovation management (e.g. Törnroos and Hedaa, 2005).

It is suggested here that the conjunction of the following four primary elements (and related sub-elements) frame kairotic moments:

1. Taking a philosophical view, we observe that consideration of *place* in the context of innovation management includes firstly marketplace and where an innovation might best be developed; secondly within an enterprise, the

establishment of physical or virtual interaction spaces; and thirdly intellectual space - matters of organizational culture that condition personal attitudes to innovation and provides reflective space (Ba - Nonaka and Konno, 1998). The culture of particular geographical places can also influence uptake of an innovation. In summary, sub-elements of place are:

- a. Marketplace (external to the firm, includes geographical considerations)
 - b. Operational space (internal to the firm, but may include collaborative ventures)
 - c. Mind-set (the personal dimension of space and culture, recognising that innovation is a creative social activity)
2. It has been recognised that the nature of an *idea* and has a significant influence on its development and deployment pathways (e.g. Utterback and Abernathy, 1975). Does it involve incremental change or radical change (relative novelty)? Is it well developed or is it still a concept (maturity)? Is the idea technology-driven or market/community driven (drivers)? Is the focus on product, process, or organisational innovation (domain)? At different stages there is interplay between idea generation and creative problem-solving practice to either fill a gap or resolve an emergent issue. In summary, the dynamics related to idea that matter are:
 - a. Idea attributes (radical/incremental; technological or organisational)
 - b. Idea generation process, e.g. from research (a pro-active activity)
 - c. Idea to solve a problem / issue (a reactive activity)
 3. Physical infrastructure is needed to develop, test and deploy an innovation, and we include accessible technology in this *resource* category, building on the 'infratechnologies' concept of Verspagen and De Loo (1999). Financial capital and infrastructure are needed to fund development and deployment. Skilled people, social capital and knowledge capital appropriate to different stages of innovation evolution are needed. In summary, three kinds of resources are needed:
 - a. Financial resources
 - b. Infrastructure (physical and technological)
 - c. Knowledge assets
 4. Temporal aspects are framed in terms of background rhythms/trends, life-cycle events and time windows, as elaborated in the following section of the paper.

A model illustrating the interaction of these four aspects of context is shown in *Figure 1*. A number of possible interactions are indicated. We have identified studies of some interaction pathways from the literature: exploring the interactions between geographical place, organization and culture (e.g. Nazari et al, 2011), exploring stakeholder interactions (e.g. Solaimani et al, 2013), locating sources of innovation, supplier - innovation user interactions (e.g. DeBresson et al, 1994), considering science and technology actor knowledge interactions (e.g. Verbeek et al, 2002). Whilst there is a substantial literature relating to creativity, markets, mind-set and requisite resources, we see there is a research gap in considering the impact of temporal factors on innovation pathways. Temporal factors are discussed in the following section.

Two hypotheses are suggested from the previous discussion of in relation to our research question (What innovation contextual factors condition an ability to explore

and exploit windows of opportunity):

- H1 - Viewing past or anticipated influential events in time as windows of opportunity can provide insights into innovation evolutionary pathways
- H2 - Four primary factors frame event context that shapes the most appropriate course of action: place, idea, resources and time, and there are multiple interactions between these elements.

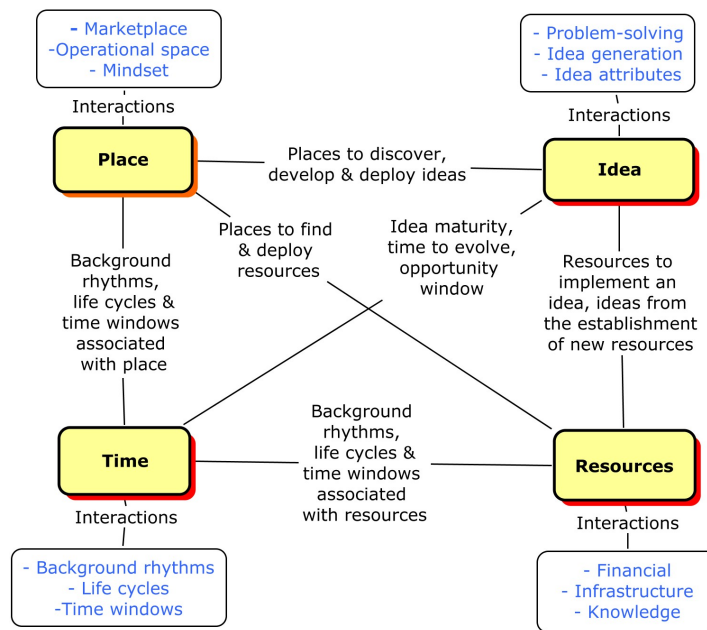


Fig. 1. Contextual factors influencing timely decision-making drawing on the Ancient Greek notion of *kairos*

3 Temporal factor observations from the literature

Cheng and Van de Ven (1996:598) studied events in time and observed, “prior research eliminated the plausible explanation that the onset of innovation development can be modelled as an orderly periodic process of adaptive trial-and-error learning.” They noted that action-outcome patterns differed within two temporal periods, one associated with exploring the idea where external events could have a significant impact, and the other associated with market entry and exploitation of the innovation where matters of scale-up and competition influenced outcomes. Their analysis of the time-series patterns of events in the innovation journey of two biomedical firms over about ten years supported the proposition that the journey may start in chaos but finish in order, whilst context events seemed to appear randomly throughout the journey. The latter events may positively or negatively influence progress. Kairotic moments (positive impact) and critical junctures (negative impact) may be associated with transitions between stages, be associated with what is learned within a stage, or with some

internal/external context factor. At each point, a business decision may be made to proceed as broadly planned but be consistent with changed circumstances, to abandon the innovation, to put it on hold, or to sell off whatever has been developed to that point. Ancona, Okhuysen, and Perlow (2001) observed that research on time in organizations spanned disciplines and introduced a wide range of concepts. They also discussed the merits of assembling multiple viewpoints. Their study identified three categories of variable: conceptions of time, mapping activities to time, and actors relating to time. In this paper, we start by considering multiple viewpoints of time in an innovation management context, and then consider activities and actors in our case studies. European researchers Andersson and Mattsson (2010) observe that matters of time are often raised in discussions with business managers. Their study of academic marketing-related literature identified a number of papers under different temporal themes - first mover advantage, product life cycle, time to market and strategic windows. Our review of the innovation literature regarding temporal factors noted a range of focus areas, as shown in Table 1.

In our theoretical framework, we cluster these factors using three conceptions of time, each representing different patterns:

1. Time windows - points in time
2. Life cycles - inter-related blocks of time
3. Background rhythms - on-going patterns in time

We now briefly discuss each in turn.

2.1 Time windows

A *window of opportunity* or a critical juncture may emerge from a conjunction of life-cycle and background rhythm patterns. In considering an intervention exploiting a window of opportunity or confronting a critical juncture, the influence of adjacent background patterns needs to be understood in taking a decision to act (e.g. Soifer, 2012; Wenger, Hawkins and Seifer, 2012). Examples of adjacent patterns are market trends and technology trends.

2.2 Life cycles

Taking an innovation management perspective, Westerman et al (2006) point out that different kinds of organisation design are needed to effectively manage different stages of the innovation *life-cycle*. Others point out that a firm's strategic orientation (Nadkarn and Narayanan, 2007) and pace of new product development (Carrillo, 2005) depend on the clockspeed of the industry it is embedded in. At some point the innovation may be superseded, but the capability developed to support it may be re-used. *Life cycle stages* have been characterised in different ways by different researchers. Bessant and Tidd (2007) discuss three core innovation activities: generating ideas, evaluating them and implementing them. Others (e.g. Ulrich, 2002) describe implementation activities in more detail, including incubation, investment, integration and improvement stages. Buisson and Silberzahn, (2010) suggest that successful innovation facilitates market domination. Life cycle stages have also been characterized in terms of project team establishment and enterprise evolution (e.g. Phelps, Adams and Bessant, 2007). An enterprise architecture standard (GERAM,

2000) represents such stages as: identification/concept, requirements, design, implementation, operation, decommissioning. Some innovative ideas may fail at transition points between stages, or there may be handovers to others to further progress the idea (Beckett and Hyland, 2011). Reflecting on the foregoing, we offer an extended representation of generic innovation life-cycle events in Table 2.

Table 1. Some observations about time and timing from the literature

Focus Area	Innovation Management Context
Strategic timing	<ul style="list-style-type: none"> - First mover advantage (e.g. Suarez and Lanxolla, 2007) - Time to market (e.g. Cohen et al, 1996) - Strategy as active waiting, sensing relatively rare large-scale opportunities and being positioned to rapidly grow to accommodate them (Sull, 2005)
Point in time	<ul style="list-style-type: none"> - A point in time where there is a transient opportunity to adopt a particular technology or introduce a social change (e.g. Perez and Soete, 1988; Kemp, 2001) - Some longitudinal studies of the evolution of innovations refer to critical junctures along the way: points in time where significant change was needed (e.g. Vohara, Wright and Lockett, 2004). - Stage-gates managing transition points (e.g. Cooper, 2008) - Tipping points in enterprise development (Bessant, Phelps and Adams, 2005; Phelps, Adams and Bessant, 2007)
Time windows	<ul style="list-style-type: none"> - Time windows that are strategically important to an enterprise (e.g. Erdmann, 2005) - Policy interventions and time windows (e.g. Nill and Kemp, 2009)
Time as a resource	<ul style="list-style-type: none"> - Planning for some 'organizational slack' can facilitate innovation (Lawson, 2001), - Giving employees time to discover, experiment and learn (Edmonson, 2009) - Time as an element of absorptive capacity in small firms (Beckett, 2008)
Background rhythms	<ul style="list-style-type: none"> - Long-term trends (e.g. Rinne, 2004) - Long wave hypothesis of innovation (Graham and Senge, 1980) - In a socio-technical context, transitional events may be preceded by a period of gradual change, and lead to the beginning of a new trajectory (e.g. Sartorius and Zundel, 2005). - Market trends and cyclic patterns (e.g. Johne, 1999)
Life cycles	<ul style="list-style-type: none"> - Product / Market life-cycles (e.g. Allanson and Montagna, 2005) - Technology life-cycles (e.g. Haupt et al, 2007) - Industry clockspeed (e.g. Carillo, 2005, Nadkarni and Narayanan, 2007)

Focus Area	Innovation Management Context
Maturity	- Technological and idea maturity (e.g. Makri and Lane, 2007) - Absorptive capacity - time to absorb (e.g. Cohen and Levinthal, 1990)
Time lags	- Performance attributed to open innovation (e.g. Fry et al 2013) - Long term effect of short term decisions (e.g. Chen and Van de Ven, 1996)

2.3 Background Rhythms

Background rhythms may be continuous (e.g. long-term demographic trends), cyclic (e.g. seasonal) or discontinuous (e.g. interrupted by civil or economic events). There are also background rhythms within an enterprise, e.g. associated with fiscal year events.

Table 2. Characteristic innovation project / innovative enterprise lifecycle events.

Transitional / Life-cycle stage	Activities and focus
T ₀ - motivation	Starting the innovation process. "Selling Innovation" as a developmental strategy within or outside the innovators world. This is an entry point.
Discovery	Searching for novel ideas or searching for solutions to problems, creatively working in the imagination. Here the <i>idea</i> is dominant.
T ₁ - promotion	Moving from searching to selecting. Selling the "Idea" within or outside the innovators world. This is an exit point for some innovators who licence or sell their idea
Development	Selecting options for evaluation and experimenting with / refining an idea. Here creatively working the <i>resources</i> is a dominant theme.
T ₂ - engagement	Moving from selecting to implementing – Selling the "Product" within or outside the creators world. This is an exit point for some innovators and entrepreneurs, licensing a product or selling a start-up business
Deployment	Implementing an idea, launching it into its application domain. Here the market/application <i>place</i> is a dominant theme, creatively considering virtual, physical and geographical possibilities.
T ₃ - expansion	Moving from implementing to maximising value – Selling the "Value Proposition". This is an exit point for some entrepreneurs, selling an established business
Domination (upscaling)	Capturing benefits from the impact of an innovation in a competitive environment requires on-going innovation. This is where the <i>timing</i> is a dominant theme, creatively blending matters of infrastructure maturity, market readiness supporting a clear value proposition, active waiting and fast deployment.
T ₄ – moving on	This is the norm for serial entrepreneurs or project-based enterprises, which focus on ideas for identifying substitutes or making the original idea and associated capabilities a foundation component of a new initiative.

Transitional / Life-cycle stage	Activities and focus
Displacement	Capitalise on established assets and re-deploy resources. Examples are the re-use of existing components in a new model car, and the successive displacement of telecommunications technologies that may still build on established infrastructure (e.g. Mahajan and Muller, 1996).

3 The research approach

The research question we are exploring in this paper is what innovation contextual factors condition an ability to explore and exploit windows of opportunity? Two suggested hypotheses are:

- H1: Viewing past or anticipated influential events in time as windows of opportunity can provide insights into innovation evolutionary pathways, and
- H2: that conjunctions of place, idea, resources and temporal factors associated with each event condition the nature of the response (figure 1).

Qualitative research was conducted using a multiple longitudinal case study methodology where the unit of analysis was an organisation, and where two primary elements of context (place and idea) remained constant. According to Yin (2014), a case study approach is appropriate where we seek to explain some present circumstance and require rich data sets. We have studied the evolution of a general idea adopted by four innovation intermediary organisations (e.g. Howells, 2006) - building innovation capability in their client firms. Each firm operated in a particular region (fixed place dimension with background data readily available), and organized different kinds of knowledge diffusion events. This allows us to gain insights into regional and enterprise influence factors. We chose a mix of more and less successful organisations, considering the availability of resources and the impact of positive and negative events in time. Cross case analysis was conducted using Eisenhardt's (1989:540) tactic of selecting a particular dimension, and considering similarities and differences between cases in the context of that dimension. The dimension we have chosen is the innovation life-cycle, which represents both temporal and innovation management viewpoints. Table 3 describes data collection arrangements for each case.

Table 3. Case study data collection arrangements

Case	Data Sources
1. WSITC - Western Sydney IT cluster	The WSITC website was used to collect some data on the enterprise history and membership. Personal observations were made and some informal member viewpoints noted from attendance at twelve network events over a four-year period. Personal interviews seeking information on pre-cursor and current activities were held with two founding advisory committee members and two state government employees who had facilitated cluster activities for many years. In 2008, a review of benefits provided by the cluster was undertaken, involving two focus group meetings (one government group, one

	client firm group). Ten client firms at different stages of evolution were interviewed by telephone (typical duration 30 minutes) to identify what benefits they had obtained over time from what activities. Subsequently, four Advisory Board meetings were attended.
2. Austool - technology diffusion centre	Austool provided access to Board meeting notes covering its first four years of operation, and subsequently to its annual reports. Interviews were held with three founding Board Members to identify pre-cursor activities. Access was provided to documents relating to four multi-year projects undertaken by Austool. Personal observations were made and some informal member viewpoints noted from attendance at ten network events over a five-year period. Informal one-hour interviews concerning achievements and issues were held with the CEO and at least one employee at least once each year over an eight-year period.
3. GREEN Inc - business incubator	Some background information was drawn from the enterprise website. Direct observations of governance arrangements and stakeholder activities were made during attendance at meetings over the 2006 – 2010 period. Interviews with two founding Board members provided background on the establishment of the enterprise. Telephone interviews were held with university staff charged with part-time oversight of the GREEN Inc facility each year in the period 2011 - 2016
4. AMTIL - industry association	The AMTIL website was used to collect some data on the enterprise history and membership. Personal observations were made and some informal member viewpoints noted from attendance at six multi-day network events over a ten-year period. AMTIL distributes its own magazine six times a year and access to copies was provided. A one-hour interview was held with the Foundation CEO to obtain his view of precursor activities, and the ways AMTIL had changed over some 15 years of operation.

Cheng and Van de Ven (1996) studied decision events in the innovation journey of two biomedical firms over about ten years, coding each event according to three criteria. Firstly, was it a continuation or a change in the current course of action? Secondly, was the outcome regarded as positive or negative? Thirdly, was the decision point a context event driven by internal or external background factors independent from, but impacting on the particular innovation journey? We emulated this process by collecting information from multiple sources spanning a period of ten years or more, organizing the data into yearly time blocks and identifying events within each period regarded as significant by our informants. We then re-organised these events into the life cycle frame shown in Table 2 instead of an annual frame to facilitate cross-case comparisons. Brief descriptions of each case and its regional context are presented in the first part of the following findings section.

4 Findings

The following provides an introduction to the cases, with more detail in the following cross-case observations obtained from mapping their history and from the circumstances of their client firms.

4.1 Case 1

The Western Sydney IT Cluster (WSITC) was launched in 2001 with a vision to grow Western Sydney's emergent ICT industry sector. The region had a rapidly expanding population exceeding 1.7 million people and SMEs dominated the business environment. The WSITC was supported by government department resources with the aim of growing employment. Whilst a 2009 study showed a substantial member base (300+, mostly small enterprises) had been established and employment growth was being achieved, the WSITC foundered following a cutback in government resources after the global financial crisis.

4.2 Case 2

Austool was a not-for profit technology diffusion enterprise established in concept in the late 1990's to address a number of market weaknesses in a regional (Western Sydney) toolmaking sector that emerged as global competition increased. Globalization was leading to more local competition from larger overseas companies, and at the same time larger local manufacturing firms were tending to outsource their traditional toolmaking function, which also impacted the flow of apprentices entering the profession. Despite having a member base of more than 200 individuals, Austool closed down in 2010 after it failed to win on-going government grants. But the physical infrastructure developed was repurposed as a construction industry knowledge diffusion centre, and continues to deliver regional benefits.

4.3 Case 3

Green Inc, a not-for-profit regional collaboration in Gippsland, Australia began as a partial response to the disaggregation of one of the regions primary employers, the State Electricity Commission in Victoria (SECV), under the Victorian State Government in 1994. Gippsland is a large rural economic region with a distributed population of around 250,000. Unlike the other cases, it did not have a specific industry sector focus. Construction of an incubator facility began in 1996 and, although not formally planned for, became a joint venture between Latrobe City Council and Monash University. Over time, the facility hosted 11 firms, some starting a new business and some extending their activities within the region. It was originally intended that a grant would facilitate initial operations, but this did not eventuate following a change of government. Whilst the collaborative venture is no longer active, the guiding principles and the physical infrastructure established still help to sustain the activities of some regional firms. In 2013 Federation University took over the campus and the facility, which became its Gippsland Enterprise Centre. It is now operated under the auspices of a multi-site university technology park enterprise that hosts 30 larger firms employing over 1400 people

4.4 Case 4

AMTIL (Australian Manufacturing Technology Institute Limited) is a national not-for-profit body based in Melbourne Australia, and represents the interests of manufacturing technology suppliers and users within the precision engineering and advanced manufacturing sector. It was established in 1999 as an amalgamation of two other long-running (45 years +) industry groups, and is governed by a Board comprising seven of its members and the CEO. Since formation, membership has grown to more than 200 firms and the number of services on offer has expanded. It maintains links with about 25 other professional bodies and research organisations. AMTIL maintains relationships with both State and Australian Governments, allowing it to influence the decisions made about the advanced manufacturing industry. It acts as an intermediary, facilitating the delivery of government innovation and entrepreneurship support programs to its (mainly) SME members. AMTIL draws on a network of business advisors and research connection facilitators to help deliver these programs.

4.5 Cross-case observations

In all cases the marketplace was fixed a priori with the clients being regional SMEs. At some time in the history of all cases, external political and economic events both provided windows of opportunity and created critical junctures. Whilst three of the case study organisations grew in the domination phase, only one (AMTIL) was able create a sustainable operation. The others relied heavily on direct or indirect government sponsorship, but there seemed to be a sponsor view that once suitable infrastructure was deployed and started to deliver benefits, it could become self-funding. Even though the SME beneficiaries stated that they valued the contributions of the intermediary, they were not always prepared to fund it, giving other options available to them higher priority.

SME client arrangements that made sense also depended on some temporal factors. Firstly, engagement with the clients took time, and other client operational matters took precedence where the time of key individuals was a limited resource. This meant that potential clients might seem reluctant to participate. Secondly, their need for engagement was discontinuous, and individual clients needed different support at different times. At a particular time, SME clients may have been looking for ideas to stimulate innovation, to help develop an innovation, or to help deploy an innovation. In the AMTIL, WSITC and Austool cases, this influenced the nature of group knowledge diffusion 'broadcast' events planned, and highlighted the value of more personalised 'agent' based diffusion activities with individual client interaction at a time and place that suited them (Bessant, Tsekouras and Rush, 2009).

The following subsections compare the four cases at different stages of their evolution. Concepts that have emerged from theory or coding analysis of event time series are used as a basis for comparison. Two concepts: action stimulus (what drives a need for change) and windows of opportunity (what drives an opportunity for change) are utilized in all comparisons. Both positive events creating 'kairotic moments'; and negative events creating 'critical junctures / tipping points' are represented as windows of opportunity. The latter is seen as an opportunity to turn a threat into an opportunity through creative problem solving (e.g. Gilbert and Bower, 2002).

Discovery phase comparison (Table 4). A common concept was searching for a suitable enterprise model – a focus on ideas for establishing places where resources could be shared. Those adopted came from the awareness by an individual of initiatives that had worked elsewhere in the world. The idea champions were community-minded people who were motivated to act. The different kinds of enterprise models chosen related to the kinds of industry participants to be supported. The background rhythms stimulating action related to regional socio-economic factors and the globalization of manufacturing. Windows of opportunity were related to a conjunction of the political climate and a credible idea.

Table 4. Discovery phase concepts

Concept	WSITC	Austool	GREEN Inc	AMTIL
Enterprise model identification	A regional cluster providing a means of enhancing the competitiveness of many small firms.	Emulating an established Portuguese initiative linking toolmaking firms with a technology diffusion centre	Establishing a business incubator located on a university campus	Establishing a combined government lobby and innovation intermediary national organization
Action stimulus	Job creation in a growing region	The owner of a regional toolmaking firm pursuing global competitiveness	Job creation in a region undergoing structural change	Seeking global competitiveness and accessing government support programs
Window of opportunity	A regional politician had been impressed by the operation of some IT industry clusters in other parts of the world, and had responsibility for regional growth	The industry champion was also a member of a State Government industry innovation panel, and promoted the idea to government	A perceived political opportunity to stimulate SME growth as a way of compensating for the downscaling of a large State employer in the region	The merging of two regional industry associations that failed to sustain adequate scale was seen as a viable alternative to closing them down completely

Development phase comparisons (Table 5). Unlike the situation in an established enterprise that may allocate resources to develop an idea, our cases were more like start-ups that might initially draw on in-kind resources. But they all had a need to access to funding / infrastructure to achieve their goals – establishing resources at their chosen place to implement their idea. Three of the cases relied on government support, and

were significantly influenced by the ebb and flow of policy and program directives. The other case, AMTIL, was influenced by the ebb and flow of global and local manufacturing industry dynamics. Austool and AMTIL were established as commercial companies. WSITC and GREEN Inc were established in the style of virtual enterprises operating under a brand name. The background rhythms stimulating action were a focus on regional SME economic sustainability and governments seeking mechanisms to better engage with SMEs. The windows of opportunity came from a conjunction of government policy interventions and buy-in by a core of industry SME champions.

Table 5. Development phase concepts

Concept	WSITC	Austool	GREEN Inc	AMTIL
Establishing a resource base	A collaborative virtual enterprise was hosted within a government department and supported by two allocated staff members with in-kind contributions from industry and other government departments. Participation protocols were developed.	A physical technology diffusion centre within a technology park was to be established by the State on unused government land. An industry-driven not-for-profit enterprise would operate the centre, drawing income from sub-letting the facility	A physical facility was to be an interaction space constructed on a local university campus, but separated from the university and run independently. Construction was funded via an Australian regional development grant, and operations were to be overseen by a community-based Board.	Head of a steering committee set up to oversee amalgamation was appointed CEO. A core team was established in a rented office facility. Funding was from member firm subscriptions, from an annual technology exhibition, and advertising in a new bi-monthly magazine
Action stimulus	The primary development focus was on knowledge sharing and networking to facilitate SME growth in the region.	A synergistic critical mass of toolmaking enterprises was to be drawn to the technology park. Austool appointed a CEO who was initially hosted by the Champion's firm	Industry/academia cooperation was an anticipated benefit where the technical skills of the university staff could be matched with business needs, and research could be exploited to develop new businesses.	The initial focus was finding scale to be self-sustaining and present as a credible voice of the industry to governments.

Concept	WSITC	Austool	GREEN Inc	AMTIL
Window of opportunity	A State government policy initiative with industry inputs via a steering committee	In parallel with facility development, Austool bid for funding under a variety of Australian government SME development grants available at the time.	The political climate approaching an election stimulated the provision of a government grant to build an incubator facility	Expanding beyond the original two State membership to attract national membership and government grants supporting expansion of services

Deployment phase comparison (Table 6). Two concepts evident at this stage were sub-elements of the place element of figure 1: the need to engage effectively with more client SME firms (marketplace) and the (quite different) mind-sets of the particular case study enterprise (culture).

Table 6. Deployment phase concepts

Concept	WSITC	Austool	GREEN Inc	AMTIL
Market engagement	State Government employees facilitated SME engagement, linkages with research institutions, and with other government departments networking events at a government conference facility were organised under the guidance of an industry advisory board.	Events were initially held in local community facilities. When the technology diffusion facility was finished it was an empty shell, but two providers of advanced technology were persuaded to set up there, and grants were obtained to demonstrate some advanced IT tools.	Five tenants moved into the newly constructed facility. There were two formal networking events each year where launch tenants could share background knowledge and identify opportunities for collaboration, and potential tenants could ask questions.	Members are both advanced technology providers and users. Engagement was through networking events and the widely circulated magazine. A technology expo with around 200 exhibitors and thousands of visitors was held annually in Melbourne or Sydney
Mind-set	Understanding individual client needs and knowledge	Program delivery and knowledge	Client project brokering	Technology diffusion and market knowledge

Concept	WSITC	Austool	GREEN Inc	AMTIL
	sharing	broadcasting		broadcasting
Action stimulus	Deployment was rapid as the WSITC used established connections and infrastructure to enact policy directions and support SME client growth	Austool won a substantial grant to introduce some emergent technologies to toolmaker SMEs and to help establish collaborative project ventures.	A political change restricted on-going support. The university provided some administration support and members of the Board encouraged engagement through their social networks.	The need to deliver value to members and government stakeholders in a changing business environment stimulated a pragmatic business focus.
Window of opportunity	Client windows of opportunity were created through networking events (see note)	There was a 2-year delay in establishing the planned technology park and the physical technology diffusion facilities which impacted operations (see note)	The planned incubator facility was constructed on time, and tenants moved in.	The annual technology expo and magazine articles provided opportunities for the member firms to engage with both established and potential new customers

The background rhythms at this stage were the need to build credibility with both sponsors and clients. Windows of opportunity were created for both the enterprises and their clients through personal networking and organizing different kinds of networking events intended to stimulate kairotic moments for the SME clients.

WSITC Deployment Note. It was found that different WSITC participating firms had different needs, depending on their own stage of development, and three kinds of events were organized. The first was a networking event where firms shared stories about their development journeys and ideas facilitating enterprise development. This kind of event was well supported by small firms, but their engagement was intermittent. It was subsequently established that this was not due to a lack of interest, but because they were consolidating what they learned before re-engaging. The second kind of event was intended to stimulate technology diffusion, primarily from research organizations. This attracted firms that were looking for ideas to stimulate a new growth phase. The third kind of event was focused on export market development that was of interest to firms that had developed novel technologies.

Austool Deployment Note. Austool was faced with a critical juncture at this stage. The delay in physical facility development had a significant impact on the original idea. Firstly, the toolmaking firms that had planned to set up in the technology park could not wait, and went elsewhere. Secondly, the plan to sub-lease parts of the facility to technology providers was further compromised by a downturn in economic conditions. This forced Austool to focus on winning a succession of competitive government grants.

Domination / Scale-up phase comparison (Table 7). What we have called the domination phase (making an impact) is generally represented as on-going continuous improvement in the innovation management literature. It is assumed that the business plan supporting development and deployment of an idea is enacted. Following successful engagement with an initiating client base, our case study enterprises pursued opportunities to increase the scale of their client base or the scope of the services they could offer. Not all succeeded, and it is our observation that assumptions embedded in the original plans had to be reconsidered due to changing business dynamics (matters of timing). The entrepreneurship literature is more oriented towards finding windows of opportunity under these conditions than the innovation management literature. In our case studies, the main concepts noted from our event coding at this stage were expanding influence, with a value proposition having a significant impact. This proposition had to make market (i.e. SME clients) and investor (client firms and governments) sense to support a sustainable operation.

Table 7. Domination phase concepts

Concept	WSITC	Austool	GREEN Inc	AMTIL
Expansion of influence	Membership grew to about 300 firms over many years. Personal facilitator meetings with smaller firms were an essential component of its success. As the facilitators were government employees there seemed to be information exchanges with small firms that may have not happened otherwise due to their practice	Austool participation grew after the physical facility was established, with a membership list of around 300, supporting more networking events. This seemed impressive, but in part was due to Austool allowing individual membership, e.g. by university students. However two small firms became rent-	GREEN Inc failed to grow as a collaborative venture, despite in-principle support from local government authorities. More regional start-ups grew independent of GREEN Inc as they could access more support resources from a State Government department in major cities throughout the	AMTIL expanded its services in three ways. An on-line portal (Industry Link) was established to connect customers with its members. AMTIL became a research partner on behalf of its members in some collaborative technology research ventures (see note). AMTIL hosted more government programs

Concept	WSITC	Austool	GREEN Inc	AMTIL
	of protecting IP through a trade secret strategy.	paying tenants	region.	facilitating SME development.
Client and Sponsor Value Propositions	SME Client viewpoint: low cost of participation (no membership fees), new ideas, new opportunities. Sponsor viewpoint: job creation, export market facilitation	SME Client viewpoint: low cost of participation (no membership fees), new technology and collaboration ideas. Sponsor viewpoint: effective intervention program delivery, building SME absorptive capacity	SME Client viewpoint: reasonable rent, convenient position, access supplementary facilities. Sponsor viewpoint: University engagement opportunities, rental income	SME Client viewpoint: modest membership fees, ideas and connections to enhance competitive positioning. Sponsor viewpoint: achieve industry client objectives and offer an effective government / SME interface
Action stimulus	Government sponsor guidelines – expanding engagement drove the facilitators. Changing IT sector technologies and business conditions drove members	Government grants supporting SME capability enhancement. Competition from some related industry association bodies	Establishing economically sustainable working arrangements to keep the incubator facility open.	The impact of the Global Financial Crisis and Australian manufacturing industry rationalization saw the demise of some member firms and other industry associations.
Window of opportunity	Windows of opportunity were created for client firms: see note below	Opportunities to secure government grants dried up after the Global Financial Crisis. Some limited opportunities were created for client firms: see note below.	Transfer of physical facility ownership from the government to Monash University independent of the GREEN Inc collaboration	Broadening the member base flowing from the demise of some other industry associations also facilitated access to different kinds of government grants

WSITC Domination Note. Many medium sized firms attributed their growth to ideas and help they got from WSITC engagement. However, unlike the situation observed in other industry clusters, very few multi-member collaborative projects were initiated, only the development of some preferred supplier relationships. For those firms that had grown and were pursuing export markets, working with the appropriate government department and sharing their experience was valued. A survey indicated that significant employment growth was attributed to WSITC participation, and those firms that had grown became staunch supporters of the WSITC. The technology trend towards cloud computing provided windows of opportunity for some firms and difficulties for others.

Austool Domination Note. Austool's attempts to establish collaboration amongst its members met with limited success. In contrast with the WSITC case, Austool members did not share their experiences at networking events for fear of revealing some form of trade secret to their competitors. Membership of all associations in this industry sector fell as a result of industry restructuring. The two technology provider tenants remained in the Austool building for a period of time, but the State Government owner decided to re-purpose the building.

Green Inc Domination Note. In its early stages the GREEN Inc regional collaboration entered a period of rapid network growth that was also characterised by inconsistent strategy implementation, as well as tensions regarding its specific role within the community. Some university research groups were located in the incubator facility, but this arrangement was not maintained. There were broader concerns about the viability of the Campus. Temporal issues were central to GREEN Inc's erratic development, as it was anticipated that the facility would be able draw businesses to it and act as a catalyst for innovation from within an extensive area of rural Victoria. Innovation and incubation within Gippsland was a regular occurrence, but industry was not prepared to relocate to a facility that could be up to several hundred kilometres from its markets.

AMTIL Domination Note. The Australian Government had a well-established Cooperative Research Centres program, but had experienced some difficulty in sustaining SME participation. Centres were funded for periods of 7 years, but most SMEs could not sustain a burst of applied research activity for that time, so AMTIL became a research participant organizing individual SMEs to participate in shorter, very focused projects.

Displacement phase comparison (Table 8). A displacement phase is not commonly considered in the innovation management literature, although it does appear in literature on project-based organisations and entrepreneurship. The common displacement phase theme in our cases was seeking new ways to build on the assets accumulated.

Table 8. Displacement phase concepts

Concept	WSITC	Austool	GREEN Inc	AMTIL
Re-framing asset utility	A number of SME client firms formed a WSITC not-for-profit company, but have put it into	Austool was forced to shut down after it failed to secure on-going government	GREEN Inc was abandoned as a collaborative venture. The physical facility	AMTIL has not entered a displacement phase

Concept	WSITC	Austool	GREEN Inc	AMTIL
	hibernation rather than abandon the idea. A particular member concern was the ability to retain 'trade secrets' without the independent government involvement.	grants. The physical facility was re-purposed as a construction industry education and technology transfer organization run by a regional Vocational Education Training organization.	is supported by a few rent-paying tenants and has been integrated with an industry engagement strategy successfully operated elsewhere by its new University owners.	
Action stimulus	In the late 2000's the global financial crisis impacted the smaller member firms and there were funding cuts that saw the withdrawal of the government facilitators. Residual SME supporters were unable to self-fund and put time into an on-going enterprise	After the 3-year embargo period, the Austool technology park rapidly filled up, creating significant local employment. So from the State Government point of view, the investment returned their original capital outlay and supported a viable skill enhancement facility	An intention to better leverage the established facility as a University regional engagement asset. This is a significant change from the original idea, where the foundation university (Monash) was a supporter of an independent initiative.	Regular reflection on current and anticipated business conditions
Window of opportunity	Some of the social networks that were built have continued to engage with a local government "Smart City" initiative that has included establishing a small IT incubator facility.	It was reported that some individuals who met whilst training in the re-purposed facility have started new businesses together.	A re-structuring of Victorian university regional campuses through the creation of Federation University has provided coherent governance arrangements	Not Applicable

5 Discussion

Our research question was: What innovation contextual factors condition an ability to explore and exploit windows of opportunity?

Our first hypothesis (H1) was that viewing past or anticipated influential events in time as windows of opportunity can provide insights into innovation evolutionary pathways. We framed macro-level events relevant to innovation management in the expanded life-cycle view outlined in Table 2. We suggest this brings together innovation management and entrepreneurship orientations, with the former tending to focus on the earlier stages and the latter on later stages. There is a different emphasis at each stage, starting with the idea, then resources, then the marketplace and an emphasis on timing and alignment with external conditions supporting scale-up. In three of the four case studies we were able to observe a displacement stage, which introduced some important discussion points. The preceding section of this paper maps four cases over this life cycle— so what did we learn?

The Ancient Greek concept of *kairos* we have embraced is about events in time, which we have characterised as windows of opportunity in an innovation context. In our case study enterprises, entrepreneurial idea champions sought windows of opportunity to attract government support to establish the WSITC, Austool and GREEN Inc. Soon after formation Austool and GREEN Inc's original plans were compromised as resources they had planned on were not delivered as anticipated by their government sponsors - potential windows of opportunity had closed. At a later time government support for the WSITC was withdrawn in favour of alternative investments. Whilst this provided a window of opportunity for some of the members to continue the enterprise, they could not attract the level of resourcing needed.

In the AMTIL case, its two forerunner organisations had reached critical junctures, where their displacement supported the formation of AMTIL. This pattern was repeated again at a later time. Some members of other industry associations that had closed down following the Global Financial Crisis or global manufacturing industry restructuring joined AMTIL. This had a number of effects. Firstly, it maintained a serviceable membership base, as these members tended to be survivors too. Secondly, it broadened the industry base supported. Thirdly, it positioned AMTIL as a credible partner to help deliver government SME support programs.

Our case study enterprises sought to offer windows of opportunity to their clients to stimulate *kairotic* moments - flashes of inspiration - through formal events and personal networking. This was achieved with varying degrees of success, and some examples follow.

In the WSITC case a high-tech start-up firm was persuaded to enter a regional innovation award competition, which it won, attracting the attention of a succession of large clients. Another member firm was persuaded to attend an international trade show in Dubai, where it identified a global market niche for its product, again supporting growth. In a third instance, a firm that had just patented a new idea was reflecting on where and how to best apply it, when this was mentioned to a government export facilitator at a network event. The suggestions made by this facilitator, combined with other information accumulated led to a '*kairotic moment*' – a flash of inspiration about 12 months later, and subsequently to rapid deployment of the idea. Our survey of

WSITC members indicated the respondents had all experienced a flash of inspiration at some time, but there were often years between such events.

In the Austool case most members were individuals rather than firms, and few kairotic moments were recorded. One member decided to import an advanced 3D metal printing machine and install it in the Austool facility. This attracted a lot of attention, as 3D metal printing was still an emerging technology, but still a relatively expensive proposition. The results hoped for were not realised, as it was a matter of wrong place, wrong time.

In the GREEN Inc case, one founding tenant grew, and took over several offices in the building. This firm persuaded one of its international suppliers to move into the building to better support its growth, and undertook an environmental process improvement initiative in conjunction with another tenant.

AMTIL provides member windows of opportunity in a number of ways. It holds several networking events each year at different locations. Many are co-badged with other organisations, increasing the number of events available. The national trade show AMTIL runs over several days each year offers members (and non-members) a place to both market their products and learn about emerging technology. The show attracts thousands of visitors, and also hosts an 'opportunity cafe' where researchers, industry and government exhibitors can explore cooperative possibilities.

Three kinds of dynamic that conditioned events in time were observed in the cases:

- Background macro-economic and technology trends - in particular the globalisation of manufacturing, the global financial crisis, changing government support priorities, e.g. promoting environmental innovation, and the trend towards the internet of things and cloud computing.
- The interplay between case study enterprise stage of evolution and its perception of and response to macro-trends. Some macro-trends stimulated case enterprise establishment (see Table 4), but could also lead to their demise.
- The interaction between case study enterprise client industry clock-speeds (e.g. Nadkarni and Narayanan, 2007), and responses to background rhythms:
 - WSITC - relatively fast IT sector clock speed, but customers may be from lower clock speed sectors such as health.
 - Austool - Toolmaker members primarily influenced by automotive sector project clock speed, but all clients want fast turnaround associated with their new product development initiatives
 - GREEN Inc – long-term incubator client firms were influenced by their low clock speed industries (forestry and health) and the distributed nature of their operations.
 - AMTIL - members from multiple sectors with varying clock speeds - food, automotive, aerospace & defence, mining & resources, medical, plus renewable energy and clean technology. AMTIL dedicates one issue of its bi-monthly magazine each year to each sector. Working with multiple sectors may soften the impact of low demand from a particular sector, but may generate a huge demand for services if they all peak at the same time.

This has two implications. Firstly, opportunity time windows will vary, both in their duration and frequency with faster responses being required in faster clock speed

sectors, as observed by Souza et al (2004). Secondly, there will be times when the smaller firms may not have the capacity to participate, as they are too busy. This brings up the notion of time being an aspect of absorptive capacity (Beckett, 2008).

The case study enterprises organised events in time to facilitate knowledge diffusion and SME innovation capability development. Bessant, Tsekouras and Rush (2009) researched the development of innovation capability in SMEs, noting four different mind-sets: (a) unaware / passive not seeing a need to innovate; (b) reactive, with limited resources or knowledge, (c) strategic, with procedures in place, but may have difficulty beyond current boundaries; and (d) creative with established capabilities and prepared to pursue windows of opportunity. They refer to 'broadcast', 'agent assist' and 'peer assist' forms of intervention to build innovation capability. Our case study enterprises formally adopted a 'broadcast' strategy, but informal 'peer assist' activities were observed in the WSITC and AMTIL cases. Informal 'agent assist' strategies were found necessary in working with micro-firms in the WSITC and Austool cases, fitting in with time windows that suited such firms. AMTIL have more recently adopted a formal 'agent assist' by engaging a network of business advisors and research connection facilitators to help deliver a government innovation / entrepreneurship support program. These facilitators have to fit in with time window considerations of the member clients.

In table 2 we characterized the life-cycle of an innovation in terms of some generic stages, and we used this as a framework in section 4.5 to compare the cases, however each of these stages also has its own life-cycle, as do transitional events between stages. Viewed as events in time, a particular stage or transition may take months or years to complete, with significant events occurring within this time. It has been suggested elsewhere (GERAM, 2000) that life-cycle models have recursive properties, so for example we could look into the discovery stage of a particular case and again use the events in table 2 to explore that stage in more detail. In reflecting on what inspired the search for an idea, we might consider regional context in more detail, and our more detailed coding of our source data indicates there are certainly stories to tell about such a question. Whilst this process helped us explore past events in a structured way, it is suggested here that using the events of table 2 as prompts may also help explore possible future scenarios in the same way. Further discussion of this observation is beyond the scope of this paper, and may be a topic for future research.

Our second hypothesis (H2) was that four primary factors frame event context that shapes the most appropriate course of action: place, idea, resources and time, and there are multiple interactions between these elements. So what observations can we make here?

Separate from the case study work we have discussed the combination of right time /right place in some of our post-graduate management classes and with some of our consulting clients, and it makes immediate sense to such practitioner groups. When it comes to a means of anticipating the right time and place, things get complicated, but introducing the model shown in figure 1 facilitated further discussion. There are potentially more than 100 questions that might be asked about interactions between the 12 sub-elements shown in the model. We observe that firms reduce this complexity by assuming that one element is fixed and concentrate on matching other elements. For example: a firm understands its organization, its culture and marketplace (place), but

wishes to match an idea with the requisite resources. Fewer firms make matters of timing their primary viewpoint, despite its perceived importance. Our case study enterprises assumed matters of place and their central idea were clear, and they could focus on resource aspects. In Table 9 we have presented some observations from the cases from a temporal viewpoint with other sub-elements of our model, providing context.

Table 9. Mapping Case study elements of context

Element of Context	Temporal Viewpoint		
	Window of opportunity	Life-cycle	Background rhythms
Market place	Case study clients valued the identification of marketplace windows of opportunity	Client marketplace maturity and industry clockspeed influenced the nature of opportunities	Client market trends (growing / shrinking, nature of competition) influenced the types of innovation undertaken
Organisational space	Client internal windows of opportunity facilitated by new capabilities	Understanding client organisation maturity and individual project stage-specific capabilities needed	Trends in scale and scope of organization activities
Mind-set	Entrepreneurial mind-set imagining possibilities	Combining divergent and convergent thinking at different life-cycle stages	Influential trends in government policy and community norms
Type of idea	Opportunities for a particular type of innovation	Relative maturity of idea	Trends favouring particular kinds of ideas
Idea generation process	Concept identification networking	Exploration process maturity (e.g. R&D capabilities)	Ideation process trends (e.g. open innovation)
Creative problem-solving process	Solution-seeking networking	A focus on learning - what is known and what is unknown	Problem-solving tool trends (e.g. use of six sigma)
Financial resources	Grant and investment	Budget and investment	Global financial architectures, local

Element of Context	Temporal Viewpoint		
	Window of opportunity	Life-cycle	Background rhythms
	opportunities	lifecycles	policy interventions
Infrastructure resources	Opportunities to access new technology, supply chain and complementary assets	Technology maturity and accessibility of infrastructure	Infrastructure development and investment trends
Knowledge resources	Opportunities for collaboration	Established or emergent knowledge and absorptive capacity supporting a learning 'spiral'	Knowledge flow patterns (big data?) and focus areas (technology, markets)

The entries in the Table 9 'windows of opportunity' column resonate with the observations of O'Donnell (2014) on 'purposeful networking' where she observed entrepreneurial SMEs creating a variety of links for different purposes at different times. Relative maturity and accessibility influencing a capacity to act are common themes in the life-cycle column, which resonates with the observation of Louis Pasteur that 'chance favours the prepared mind'. Entries in the background rhythm column resonate with the use of foresight tools and PESTEL analysis. One possible implication of these observations is that whilst SMEs may not be specifically thinking about the three temporal factors suggested here, they may be indirectly preparing for future possibilities through networking, building dynamic capabilities, and reflecting on the external environment from time-to-time. For example, in our set of case studies, Austool undertook two technology roadmapping studies in parallel with its networking event activities. How useful they were was not explored.

It is suggested here that the case study enterprises could have improved their position by scanning the rows of table 9. For example, WSITC, Austool and GREEN Inc did not directly offer their members market opportunities – was this a fatal flaw? Is it understood that different enterprise and community mind-sets may have to be harmonized? Is a particular type of innovation best suited to a particular group of clients? The three kinds of networking events that evolved within the WSITC stimulated organizational innovation, technological innovation and market innovation would suggest do. Are specific opportunities for client firm collaboration to share knowledge assets identified? Where this was attempted in our cases, it met with mixed success, but perhaps that could be explained by considering dominant client mind-sets.

The term value proposition emerged from coding of events in the domination/scale-up phase. Idea, resources and temporal factors may combine in different ways in different markets to deliver perceived value. In our case studies, the intended clients were SMEs, and we observed different behaviours in the four cases, partly related to client firm size

and partly to the case value packaging. In the WSITC case, 60% of the members were micro-firms with a limited capacity to pay for anything. In the Austool case, the majority of members were individuals who also had limited financial capacity. In both cases, there were no subscription fees, so the members did not have to work too hard to benefit from their engagement, and many were not prepared to pay fees when circumstances changed. In the GREEN Inc case members paid rent for using the facility, which had to make business sense for them. In the AMTIL case, where members were commonly medium sized firms, they paid a significant annual subscription, paid to exhibit in the annual exhibition, and paid for magazine advertising (albeit at discounted rates). However all the activities were clearly targeted at increasing revenue or reducing costs. The message here is that getting the timing right may be important, but you also have to deliver something that is valued. Whilst three of the original enterprises stopped trading, their government sponsors got value for money in terms of jobs created and the establishment of facilities that could be re-purposed and continue to support regional growth.

6 Concluding Remarks

We started with the viewpoint that 'timing is everything' (Bowen, Rostami and Steel, 2010). But the timing of what? The timing of an idea? The timing of resource availability? The timing of market entry? The timing of business expansion? The timing of the displacement of an innovation or a technology? These are all seen as aspects of innovation management, and we have framed such events as windows of opportunity, noting the different context of specific events, leading to our research question - *What innovation contextual factors condition an ability to explore and exploit windows of opportunity?*

Consistent with the observations of others (e.g. Cheng and Van de Ven, 1996) we noted that that windows of opportunity may be anticipated or may emerge from the conjunction of internal and/or external context factors at different times. Whatever the stimulus, one has to learn from past experiences and imagine the subsequent possibilities. The first contribution of this paper is to outline ten generic events in the lifecycle of an innovation, constructed from an amalgam of innovation, entrepreneurship and enterprise development literature viewpoints (Table 2). We have used this in the paper to compare four innovative case study enterprises at different points in their evolution. We have also suggested this life-cycle framework may be used in a recursive way to look into events within a particular stage.

Adopting a temporal perspective of mapping events in time, we draw on the Ancient Greek notion of *kairos* to identify elements of context. *Kairotic* moments are associated with the intention of taking specific action - implementing an idea when the time and place are right. One has to creatively use requisite skills and resources to achieve an effective outcome. Combinations of idea, resources, place and timing frame the context, and there are interactions between them. The conjunction of background factors may also lead to a *kairotic* moment of enlightenment – an 'aha' moment that stimulates later action. This concept leads to the second contribution of the paper, a contextual factor interaction model, shown in figure 1. We note that one of these elements may take precedence at different stages in the exploration and exploitation of an innovation. We

also note that firms may reduce innovation management complexity by fixing one or more elements, for example utilizing established resources to service specific markets, but this may not position them well if markets and/or dominant technologies change. Each element of our interaction framework is broadly outlined as followed:

- **Idea.** Whilst innovation starts with an idea, some attributes of the idea and its origins influence what has to be managed. Is it an idea for a new product or process, or for an organizational change or a new way of serving a market? Has it emerged from research – an idea looking for an application, or has it emerged from the identification of an unmet need – a market need looking for a solution.
- **Resources.** What kinds of resources are needed to develop and deploy the idea? What financial support is required, what technological and supporting infrastructure (e.g. ICT, logistics) is needed, and what knowledge assets have to be accessed.
- **Place.** Where will the idea be applied and where do we look for ideas (marketplace)? What kind of organization is needed to progress the idea and where should it be located (organization)? What kind of culture supports innovation, and what are the norms of potential users (mind-set)
- **Time.** What kinds of background socio-economic rhythms and technology trends might support or inhibit progression of an idea? What life-cycle stage is the idea / market /technology at – what is its relative maturity? What is the target industry clock-speed, and what is the nature of accessible time windows;

We have raised a number of questions in this outline of the four primary and twelve sub-elements of our model. More than 100 questions might be asked by considering pairs of sub-elements, which highlights some of the complexities to be dealt with in innovation management. For example, where should we look for new ideas, and what knowledge is needed at each stage of development to progress an idea. In undertaking this research we have observed there are bodies of literature dealing with questions relating to particular combinations. For example Tushman and O-Reilly's (1996) ambidextrous organization concept argues that the combination of idea (radical or incremental), mind-set (supporting or inhibiting risk-taking) and organization (separation or integration) needs to be harmonised to deliver reliable outcomes.

Four cases are analysed in the paper using the time window and theoretical influence factor interaction models presented. All case enterprises aimed to establish an innovation intermediary organisation in a particular place with various levels of government support to stimulate job creation. Each focused on a different client market sector and had a different dominant mind-set. Three supported clients in large metropolitan areas, and the other in a less populated rural area. In two cases, a virtual enterprise was established drawing on existing facilities and a network of supporters. In the two other cases operations were based in a purpose-built physical facility. The target clients were SME firms at various stages of evolution looking to grow or survive in a turbulent business environment. The focus was on enhancing client knowledge resources or providing access pathways to specialist knowledge. Both the case study enterprises and their clients had limited financial and infrastructure resources and had to access what was externally available. For the intermediaries, this meant winning government support, generally in the form of a succession of relatively short-term competitive grants, and this proved unsustainable for three of them as macro-economic

conditions changed. It also meant that at some points in time, the effort of bidding for new grants could detract from the level of services provided. In the cases serving clients in a large metropolitan area there was good access to technological, communication and logistics infrastructure. This was more problematic in the case located in a rural area having about 15% of the population of the other cases. In two of the cases, investment was made in physical infrastructure, which has been repurposed in some way following closure of the founding intermediary organisations.

Using an extended innovation life-cycle view, the cases could be compared, even though events took place at different calendar times. All drew on ideas that had worked well in other places at other times, but the translation to an Australian context was only partially successful. Background macro and microeconomic rhythms and government policy changes both positively and negatively impacted the establishment and sustainability of the case study organisations at different times. It was observed that client engagement could seem intermittent, but closer examination showed that when a client learned something new, this could be followed by a period of absorption and consolidation. On re-engaging, the client would be better positioned to consider the next opportunity, or may seek support of a different kind. In one case, this led to the evolution of three kinds of knowledge diffusion events. One was a peer group show and tell, sharing experiences. Another was show and tell by associate research and commercialisation providers. The third was oriented towards export market access. Viewed from another perspective, each kind of event targeted different stages of the innovation life-cycle.

In this paper, we contend that the impact of timing in innovation management is linked to the identification of and response to windows of opportunity. It is suggested that four primary aspects of context will influence the ability to anticipate and react to windows of opportunity. The research has two limitations. Firstly, we have only analysed four longitudinal organizational innovation case studies. It is intended this should be supplemented by different kinds of cases, e.g. product or process innovation longitudinal studies. Secondly, our studies have looked at events in time retrospectively. It is suggested that future research may focus on anticipating windows of opportunity as an innovation management-oriented form of scenario planning. For example, at different stages in the evolution of an innovation, decisions are made to stop researching and start developing, or to stop developing and get into the marketplace. Drawing on our model, we should ask questions like where should we develop / deploy? What resources will be needed and will we have to develop infrastructure in parallel? What application ideas do we have? What is happening in the background and what timing is appropriate? These may well be questions an experienced innovation manager might ask, but we believe our list of more than 100 questions is likely to be more comprehensive.

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