

Dynamic capabilities:

Their effect on performance
mediated by product integration
in the highly acquisitive software industry

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Abstract

Building on behavioural theory employing dynamic capabilities, this paper examines how firms create competitive advantage through innovation over time after multiple mergers and acquisitions. Mergers and acquisitions are a way to acquire gaps and prominently missing features and functions; the firm then has only to assimilate them into their portfolio. This research is focused on the acquirer's ability towards obtaining performance from product integration and is set within the context of highly acquisitive software-houses; those organisations involved in the sales and manufacture of business software products. The ability to realign and innovate this will increase performance over the long term.

Keywords: Dynamic capabilities; performance; product integration; software industry; acquisition

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Introduction

According to the Business Software Alliance, BSA (2008), the software sector has enjoyed meteoric growth. In 2007, the software and related services sector experienced a real annual growth rate of 14%, compared with a real annual growth rate of 2% for all US industries, outpacing the rest of the US economy in each year since 2003. The highly acquisitive company which seeks rapid growth and use acquisitions as the means to achieve this, is using a recognised route to growth. Famously, Cisco went from being a small company in the 1990's to being (briefly) the largest market capitalised company in the world (Damodaran 2004). High growth through acquisition is cheap, in part due to accounting rules that allow the acquirer to show the benefits of the acquisition but partially hide the costs of the acquisition. This growth success is reflected in the increase of share prices and marks out the CEO of the firm as a genius (Damodaran 2004). The implication is, for the firm that has grown in this way to remain successful it has to continue on the acquisition path to keep the top-line numbers high. Léger and Quach (2009) agree and imply that in the short term, post-acquisition, the firm can relax with regard to gaining product synergies by combining portfolios: simply making an acquisition increased the financial market value. Léger and Quach (2009) determine that for acquisitions within the software market and the financial markets fail to take the potential synergy of the combined software portfolio into account when valuing the acquirer firm's shares.

As this level of acquisition is not sustainable indefinitely, many of the highly acquisitive software houses, such as SunGard (2010), have latterly attempted to focus on endogenous growth (PwC 2013) from their existing portfolio. This is more generally termed as 'organic growth' in the industry, i.e. growing the business by creating and innovating more with what they already have (Nambisan 2002a). In a press release in May 2009, Cristóbal Conde, SunGard president and chief executive officer, commented:

"We are very pleased that we achieved positive organic revenue growth in the quarter in the face of very challenging industry conditions" ... 'organic revenue grew just under 1% in the quarter' (SunGard 2009).

This raises the question as to how is it that the BSA (2008) reports that the software industry is growing by such a large margin (14%), but the internal growth of the example acquisitive software house is not? There is a possibility that the software houses are not looking at the revenue growth from increased innovation.

This study will concentrate highly acquisitive software firms and aims to describe, explain and account for the impacts of mergers and acquisitions on the impacts on innovation, in terms of product integration: the reconfiguring and combination of the product portfolios in software firms. With regard to the acquiring firm's endogenous growth, the intent is to explain the relationship between organisational capabilities and the innovation outcome, as well as the innovations' effect on revenue.

1.1 Problem definition

In 2012, software firms completed over \$66 billion of mergers and acquisitions (Berkery Noyes 2013). However research suggests that synergies are left unrealised (Barkema & Schijven 2008; Léger & Quach 2009). In addition, the software industry is maturing and mergers and acquisition activity in the industry has intensified (Léger & Quach 2009). In a report from PwC (2014) Rob Fisher, the PwC US technology industry leader notes that:

"With software embedded in virtually everything, software and Internet sector [mergers and acquisition] deal activity continues to flourish, offsetting declines in other subsectors."

For example, some of the largest deals from 2012 were (PwC 2014, p.1):

- Cisco's acquisition of NDS Technologies, a provider of content management software, for \$5 billion.
- Dell's \$2.4 billion acquisition of Quest Software, developer of application and database utilities.
- The \$1.9 billion acquisition by RedPrairie, a developer of logistics management software.
- The acquisition of SunGard Higher Education from SunGard Data Systems by Datatel for \$1.8 billion.

Léger and Quach (2009) explain that few businesses achieve the performance levels that were anticipated at the time the decision to undertake the acquisition was made. Much research has explored the mergers and acquisitions process prior to acquisition and argues that strategic fit is key for synergistic opportunities (Barkema & Schijven 2008; Hitt et al. 2009; Pennings, Barkema & Douma 1994). Latterly however, Barkema and Schijven (2008) have revealed that although strategic fit is necessary, it merely creates potential for strategic realisation through effective integration.

As software is a high-technology industry (Nambisan 2002a), the need for novel solutions has been a motivational strategy, enabling firms to extend their resources and capabilities through mergers and acquisitions (Makri, Hitt, & Lane 2010). Again, Makri, Hitt and Lane (2010) find that the pre-acquisition decisions on fit are important, however the level of the fit between the firms has an impact on innovation (creating novel solutions) in other high-tech businesses.

Nambisan (2002a) confirms that high-technology customers place increasing value on cross-product integration. On the other hand, this is challenging for the firm, since integration efforts may cause distraction from the strategic product plans, additionally the potential disruption due to the need for additional development resources and rapid evolution of complementary products. This implies that post-acquisition, in order to satisfy customer needs, the firm must innovate: that is, combine and reconfigure their products to remain competitive and profitable (Teece 2007).

Therefore, after an acquirer selects and then acquires a firm with synergistic potential, it is up to the acquirer to build the organisation in such a way as to facilitate the synergy opportunities, regardless of complexity (Barkema & Schijven 2008). The performance of the acquirer in the financial markets is not impacted by the software compatibility (Léger & Quach 2009), although there is a recognition that software firms are focusing on incorporating past strategic acquisitions, creating disruptive innovation and looking for competitive differentiators (PwC 2013).

Within high technology industries, resources are at the heart of the firm and constitute the largest cost. The resource based view (RBV) of the firm is an influential theory that offers an explanation of assets that can be used in strategic change that achieves competitive advantage (Eisenhardt & Martin 2000; Penrose 2009). This RBV perspective is focused on the internal organisation and thus complements the notion of the emphasis of strategy as positioning within an industry structure. More recently, scholars have extended the RBV of the firm to more dynamic markets, i.e. firms in situations of rapid change as the RBV does not adequately explain how and why some firms have an advantage in change situations (Eisenhardt & Martin, 2000). In these markets, where the competitive landscape is shifting, the dynamic capabilities by which firm managers “integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece, Pisano & Shuen, 1997, p.516). To this end, the development of the dynamic capabilities framework sets out to enable business enterprises to create, deploy, and protect the intangible assets that support superior long-run business performance (Teece 2007).

Dynamic capabilities are focused on the businesses that consist of difficult to replicate and trade assets and competencies, such as the high tech software industry. In addition, dynamic capabilities include difficult to replicate enterprise capabilities required to adapt to changing customer and technological opportunities. Incorporating the ability to shape the ecosystem that it occupies, in terms of product development, business model design and implementation (Helfat & Peteraf 2009; Teece 2007).

Whilst the theory has extended the resource based view of the firm, theory concerning dynamic capabilities has had little time to develop, in relative terms and as such has been criticised for having a lack of clarity, as well as a lack of empirical support (Helfat & Peteraf 2009, p.92). Eisenhardt and Martin (2000) use organisational theory to analyse the processes that underpin dynamic capabilities. Helfat and Peteraf (2009) point out that a specific capability can be tested with the same tests as a resource based test in answer to critics.

Dynamic capabilities rest on the firms process that can alter the current position leading to an effect on the firms performance and competitive advantage (Helfat & Peteraf 2009). Teece's (2007) dynamic capabilities model focuses on dynamic capability types, i.e. sensing opportunities, seizing the opportunity and recombination. The dynamic capabilities basic chain of logic (Helfat & Peteraf 2009) in Figure 1 demonstrates that subsequent to investment (seizing) the dynamic capabilities for recombination and reconfiguration can further alter the asset base leading to additional effect on firm performance. This is the fundamental problem to be addressed in this

paper. After mergers and acquisitions, the opportunity sensed and seized by the firm, do the reconfiguration and recombination capabilities lead to increased innovation (product integration) and performance?

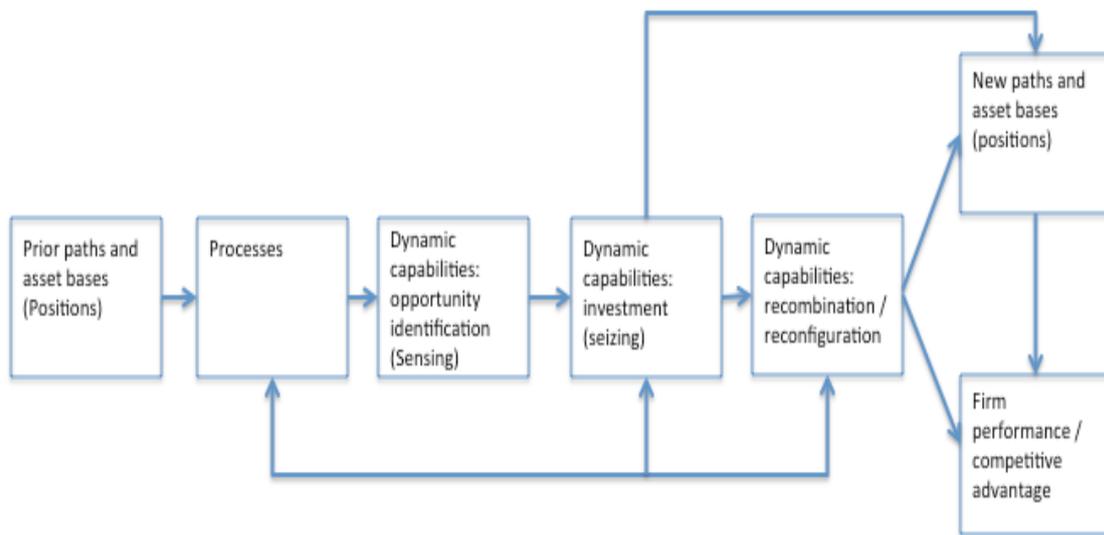


Figure 1: Dynamic Capability chain of logic (Helfat and Peteraf 2009, p.96)

In light of the business problem and the reach of the dynamic capabilities framework, it is therefore reasonable to pursue the factors that determine the product integration innovation success of software products post-acquisition as well as the impact of that innovation on the acquirer’s performance. Thus, extending the empirical work utilising this framework and adding to the body of work in strategy process incorporating management decision making, organisation routines and change.

2. Key Theories

2.1 Mergers and acquisitions

This study is concerned with organisation capabilities and behaviours that impact the success or otherwise of product integration, i.e. product innovation, post mergers and acquisition in the software industry. Mergers and acquisitions (M&A) have been a topic of great interest in research regarding financial impacts as well as for organisational and individual behavioural effects (Ager 2011; Ahuja & Katila 2001; Barkema & Schijven 2008). As Ager (2011, p.200) noted in an ethnographic study of Xerox, mergers and acquisitions are difficult to do although “they seem like a good idea.” Mergers and acquisitions are undertaken for multiple reasons, e.g. market growth, to gain economies of scale and scope and to acquire competencies (PwC 2013). Domodaran (2004) explains that analysts like companies that engage in mergers and acquisitions, and therefore invest heavily in them. Notwithstanding this, mergers and acquisitions are costly, complex, and risky. Many regard their potential as worth the time and effort, yet, many fail to meet expectations (Barkema & Schijven 2008; Léger & Quach 2009). In the software market, Grant Thornton (2011) reports that mergers and acquisition are extensively adopted. Barkema and Schijven (2008) study the unlocking of potential synergies following mergers and acquisitions and build on a theme within behavioural theory that extends the insights into organisational learning, restructuring and acquisition behaviour. This research seeks to extend the body of existing research in organisation behaviour impact to product innovation following mergers and acquisitions and further, how the performance is mediated by the product innovation.

Post mergers and acquisitions, the most difficult job of the acquirer begins; the creation of value that was expected from the deal through successful integration of the companies’ operations (Barkema & Schijven 2008; Gates & Very 2003). Whatever the acquirer’s strategy, combining two firms will often constitute a challenging task for management. The acquirer must implement synergies in order to create value while simultaneously managing issues to avoid value leakage (Gates & Very 2003). Barkema and Schijven (2008) agree that, post-acquisition, firms integrate to capture performance.

2.2 Technology Integration

This study is not focused on the integration of the company operations, e.g. HR or accounts. It is concerned with the next stage of integration, involving innovation, resource management and organization capability. Teece (2007) describes these requisite skills as dynamic capabilities and frames this activity stage in terms of the realignment of specific tangible and intangible assets. To this end, the literature review is seeking extant research that explicates the influencing factors of post-acquisition integration in the technology sector. These factors encompass wide ranging organizational influences associated with the decision to maximise value from an acquisition by realigning, integrating the portfolio and creating new product in the technology sector.

The dynamic capabilities framework, as explained by Teece (2007) is particularly relevant to high technology sectors, where company success depends upon the discovery and development of opportunities, the effective combination of internally generated and externally generated inventions, efficient and effective technology transfer inside the enterprise, the protection of intellectual property, the upgrading of ‘best practice’ business processes, the invention of new business models, making unbiased decisions, and achieving protection against imitation and other forms of replication by rivals. The software sector as described by Nambisan (2002a) is the quintessential high technology industry. It is characterised by a high rate of product and process innovation, high knowledge intensity, rapidly shrinking product and technology life cycles, global markets and intense competition.

The dynamic capabilities concept addresses how to sustain a capabilities advantage in the context of strategic change (Helfat & Peteraf 2009). Teece (2007, p.1319) opines that within fast-moving businesses open to global competition, depicted by dispersion geographically and organisational sources of innovation (and manufacturing); sustainable advantage requires more than the ownership of difficult to-replicate (knowledge) assets. The business also requires unique and difficult-to-replicate dynamic capabilities. These capabilities can be harnessed to continuously create, extend, upgrade, protect, and keep relevant the enterprise’s unique asset base. For analytical purposes, dynamic capabilities can be disaggregated into the capacity (1) to sense and shape opportunities and threats; (2) to seize opportunities; and (3) to maintain competitiveness through enhancing, combining, protecting, and when necessary, reconfiguring the business enterprise’s intangible and tangible

assets. As this study is concentrated on the capabilities necessary following mergers and acquisitions, it will analyse the capability effects on performance of reconfiguring, enhancing, combining and protecting the firm's assets, in other words, product integration.

2.3 Innovation

The overall study will explore whether, post-merger and acquisition a firm improves performance through software innovation (not invention): by combining and reconfiguring acquired products. In this context, invention refers to the development of a new idea and the establishing of property rights on that idea, for example by patents. Innovation, on the other hand, refers to the commercialisation of the invention (Makri, Hitt & Lane 2010). Within this study, the emphasis is on the creation of new product combinations and their subsequent commercialisation, thus use of the term innovation rather than invention.

Innovation has become an increasingly important source of value creation in many industries (Makri, Hitt & Lane 2010). The importance of innovation has been heightened by rapid technological change and growing knowledge intensity in industries. Because of these factors, innovation must come faster, and there is a higher need for novel solutions, especially in high-technology industries. Thus, firms have turned to mergers and acquisitions as an alternative strategy for obtaining the knowledge necessary to create innovations with the speed and the novelty necessary to either maintain a competitive advantage, or to build a new one (Hitt et al. 2009). The rapid growth of technical knowledge in the past few decades has meant that building and maintaining expertise in multiple technologies is difficult for even the largest corporations. Thus the sheer volume of acquisition activity in the high-technology sector suggests that managers view acquisitions as a mechanism for accessing technology (Ahuja & Katila 2001).

2.4 Dynamic capabilities

The literature was reviewed with relevance to post mergers and acquisition strategy execution, the term dynamic capabilities became increasingly prevalent as a way to encompass the requisite organisation behaviour and skills, particularly in the technology sector. It was Augier and Teece (2009) who framed the chosen approach towards this study. They expose the manager's problem of thinking about strategy in a 'real world' business paradigm as opposed to a pure academic one. Augier and Teece (2009) explain that a manager works across multiple disciplines to make a strategic difference, for example within resources (for allocation and management) and economics (managing income and costs), whilst the literature tends to concentrate on each discipline separately. Teece (2007) asserts that the dynamic capabilities framework contains a richer description of features and factors than those that are contained in the Penrose (2009) resource-based approach. The dynamic capabilities framework pulls together many disparate literatures encompassing entrepreneurship, decision theory, organisational behaviour, innovation and economics to identify the key classes of capabilities that firms must possess if they are to succeed in generating greater incomes over time (Augier & Teece 2008, p.1190).

The seminal work underpinning the links of strategy, organisation behaviour and performance outcome is a paper from Teece (1986), a document that generates the ideas necessary to create a framework and is a precursor to the term dynamic capabilities. Dynamic capabilities are the behaviours required, particularly in a technology environment, by a firm in order to profit from innovation. Dynamic capabilities relate to the enterprise's ability to sense, seize, and adapt, in order to generate and exploit internal and external enterprise-specific competences, and to address the enterprise's changing environment (Augier & Teece 2008; Helfat & Peteraf 2009; King & Tucci 2002; Teece & Pisano 1994; Teece, Pisano & Shuen 1997). The possession of dynamic capabilities is especially relevant to multinational enterprise performance in business environments that are open to international commerce, and are fully exposed to the opportunities and threats associated with rapid technological change (Teece 2007).

In his analysis of profitable strategies, Porter (1980) discusses his Five Forces and recommends that the firm finds an attractive position in its industry, i.e. a position which is growing, has limited competitors and is not exposed to pressure from buyers and suppliers. Porter (1980) extends this advice towards building defences (such as product differentiators) to shield from competitors. Augier and Teece (2008) find this approach insightful, but limited and too product focused, with little attention given to the firm itself or to the management capabilities.

Management capabilities and the organisation's business model have been developed from Penrose (2009) over the last 50 years. In her theory of the firm, one way of looking at the organisation is as a collection of physical and human resources; as an administrative organisation with continuity within the history of the firm. In other words, the firm's name or owners, products produced, geographical location or legal form may change, but it is still considered to be the same firm and there is continuity. Penrose (2009) sees the business enterprise as possessing bundles of fungible resources, generated in part from its prior activities. These resources can be deployed to produce a variety of final products. Managers would endeavour to reconfigure the firm's portfolio of products to meet customer needs. Like Porter (1980), Penrose (2009) explains that profits would then flow from achieving differentiation with the addition of putting excess or unused resources to work. The resources approach provides another way of increasing financial performance. Profits can flow from the possession of scarce and difficult-to-imitate resources or knowledge assets, the services of which are in demand by customers. Augier and Teece (2008) assert that the Penrose (2009) resource-based approach is, like Porter (1980), limited. Augier and Teece (2008) find the framework rather static with little consideration given to how the firm would regenerate the sources of its success. While learning, particularly managerial learning is embedded in the resource-based approach, the organisational (and individual) capabilities that enable the business to build and maintain value-enhancing points of differentiation are not.

The dynamic capabilities framework is to create, deploy, and protect intangible assets that support short and long-term performance. Teece's (2007) framework is built on a Penrose (2009) resource based approach to behavioural theory with organisational decision-making. That is, resource based theory is given the context of business enterprises consisting of portfolios of idiosyncratic and difficult-to-trade assets, competencies or resources. Within this framework, competitive advantage can flow at a point in time from ownership of scarce but relevant and difficult-to-imitate assets, especially know-how. However, in fast-moving business environments open to global competition, and characterized by dispersion in the geographical and organisational sources of innovation and manufacturing, sustainable advantage requires more than the ownership of difficult-to-replicate knowledge assets (Augier & Teece 2008; King & Tucci 2002; Teece 2007). Sustainable advantage also requires unique and difficult-to-replicate dynamic capabilities according to Teece (1990 in Teece 2007). These capabilities can be harnessed to continuously create, extend, upgrade, protect, and keep relevant the enterprise's unique asset base. Teece's (2007) dynamic capabilities are described and contextualized in three discrete groups. 1, *Sensing*: to sense and shape opportunities and threats, 2, *Seizing*: to seize opportunities, and 3, *Enhancement*: to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets.

3. Discussion

This research focusses within the third section of the dynamic capabilities framework, *Enhancement*, represented in Figure 2. This is a post-decision study. The strategic decision to undertake a merger or acquisition has been made and executed i.e. sensed and seized in dynamic capabilities terms.

Enhancing, i.e. redeployment and reconfiguration may also involve business model redesign as well as asset-realignment activities, and the revamping of routines. The redeployment can involve the transfer of non-tradable assets to another organisational or geographic location (Teece 1977; Teece 1980). It may or may not involve divestments. Helfat and Peteraf (2003) suggest that capability redeployment takes one of two forms: the sharing of capability between the old and the new, and the geographic transfer of capability from one market to another. Both are possible, but neither is easy.

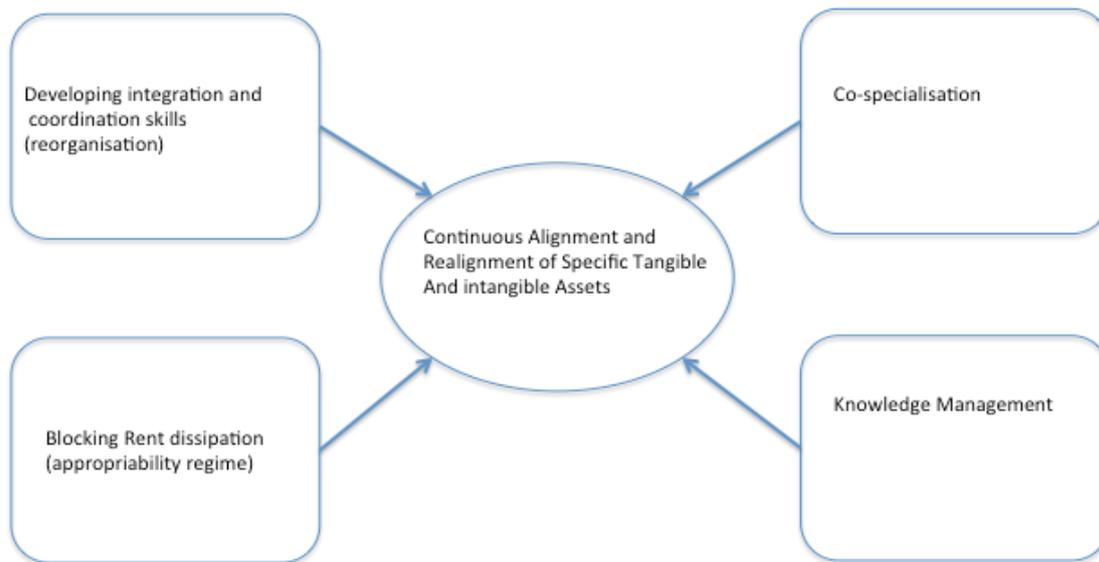


Figure 2: Enhancing: Combination, Reconfiguration, and Asset Protection Skills. Adapted from Teece (2007)

If the firm is to differentiate itself from its competitors, it must provide a product (or service) to its customers that is in some way superior to that of its competitors (Xu, Huang & Gao 2012). Competitive success arises from the continuous development, renewal and reconfiguration of firm-specific assets, which is important. After an acquisition of a software company, the firm has acquired products as well as the people that have knowledge (tacit as well as documented) about the products; in other words, they have the difficulty in replicating skills and capabilities. This means that, as with the Penrose (2009) approach that saw the business enterprise as possessing bundles of fungible resources, generated in part from its prior activities, these resources could be deployed to produce a variety of final products. Managers then endeavour to reconfigure the firm's portfolio of products so as to meet customer needs. Profits then flow from achieving differentiation. This study selects the description "product integration", to explain the development of new product creation to satisfy customers, following mergers and acquisitions.

The dynamic capabilities approach is consistent with the view that emergence of new products and processes results from new combinations of knowledge and that processes of organisational and strategic renewal are essential for the long-term survival of the business firm. In technology sectors according to Teece (2007), the foundations of enterprise success depend upon the effective combination of both internally generated and externally generated inventions and innovations, efficient and effective technology transfer inside the enterprise, the protection of intellectual property, the upgrading of best-practice business processes, the invention of new business models, making unbiased decisions, and achieving protection against imitation and other forms of replication by rivals.

In high technology markets the integration of new products has become a strategic necessity: with customers placing increasing value on cross product integration (Nambisan 2002a), rather than invention such as new patents and new product development. This study is concerned with the impact of the firm's capabilities to embed acquired knowledge in new goods and services (product integration), launch products and services into the market (innovation), and moreover, the firm's ability to increase revenues to the firm, following acquisition activity.

3.1 Product integration

The term product(s) within this research relates to the end product(s) that are the final goods (and services) produced by the firm based on the utilisation of the competences that it possesses. The performance (price, quality, etc.) of a firm's products relative to its competitors at any point in time will depend upon its competences, which in turn depend on its capabilities (Teece, Pisano & Shuen 1997, p.516). The term "Product Integration" is directly related to the transformation of the software product portfolio held by the firm, following mergers

and acquisitions (Nambisan 2002a; Léger & Quach 2009). The extant literature on product development indicates that implementing incremental product changes is contingent on the flexibility of the product strategy and the development environment (Nambisan 2002a).

The new combinations of products demonstrate ability to earn long-term returns. The management's ability to combine and reconfigure specialised assets to meet changing customer needs build long-run value. If an enterprise possesses resources and competences but lacks dynamic capabilities, it has a chance to make a competitive return for a short period; but it cannot sustain supra-competitive returns for the long term except through chance. "It does not earn those Schumpeterian rents associated with 'new combinations' and subsequent recombination, or Kirznerian rents associated with bringing markets back into equilibrium" Teece (2007, p.1344).

The software industry is experiencing dramatic growth (Nambisan 2002b). Grant Thornton (2011) explains that acquisitive software firms in 2011 are looking to build access to new customers and acquire innovative technologies. The ability to recombine and reconfigure the assets and organisational structures as the enterprise grows and technologies change is key to sustained profitable growth (Teece 2007). Routines help sustain continuity until there is a shift in the environment. If innovation is incremental, routines and structures can probably be adapted gradually or in (semi-continuous) steps. When it is radical, such as after an acquisition, then there will be a mandate to completely revamp the organisation (Teece 2007). The integration of each of these acquisitions requires considerable time and effort, thus often causing the burden on the acquirer's management to increase as its string of acquisitions grows (Barkema & Schijven 2008; Penrose 2009). Eventually, major organisational change may be needed to combine all the various pieces into an integrated network of operations suggesting that the role of organisational fit extends beyond the level of an individual acquisition (Barkema & Schijven 2008).

Nambisan (2002a) argues that the adoption of proactive initial technology strategy critically determines the ability and intensity of a high-technology software venture to rapidly and efficiently integrate its product with complementary (where a complementary product is one that enhances the value of a central product when the two are used together by end-users) products. Teece (2007) also finds complementary innovation (and complementary assets) are of great significance, particularly in industries such as software, where, for example, business applications can be especially valuable to users if they can somehow be integrated into a single program suite.

Because of decision-making based on limited information, i.e. bounded rationality, acquirers are typically unable to optimally integrate acquisitions the first time around (Barkema & Schijven 2008). Therefore, the acquisitions can be thought of as pliable, "pieces of clay that firms attempt to mould" (Karim, 2006, p.804) repeatedly to unlock as much of their value potential as possible over time. Barkema and Schijven (2008) find that the post-acquisition integration and restructuring cycles evolve over time, as a firm gains experience with acquisitions and restructuring, noting that it is quite common for firms to use organisational restructuring as a means of experimenting with structure to find more promising configurations (Barkema & Schijven 2008; Karim 2006).

According to the resource-based view of the firm, acquisitions are an important part of the business process of redeploying resources into more productive uses (Ahuja & Katila 2001; Capron and Mitchell, 2009). Through acquisitions, firm-specific assets housed within one organization are merged with assets in another organisation to improve the productivity of the combined assets (Ahuja & Katila 2001). Evaluating the post-acquisition performance of firms provides evidence on the efficiency of this asset-matching and combining process. This study relates acquisition characteristics and firm capabilities to the innovation performance of acquiring firms' innovation outputs: to be measured from the number of new products launched and number of product line changes made (Ahuja & Katila 2001; Nambisan 2002a).

3.2 The mediating effect of product integration

The capabilities discussed have thus far been directly associated with performance. However, this study also focuses on whether, the success of product integration (innovation) in the highly acquisitive software firm has an impact on performance and in which way the capabilities to create and configure new product (i.e. innovate) makes the firm more money. This is to highlight any evidence that the organisation's capabilities and behaviour have a direct relationship to performance; a direct relationship to product integration, or whether the product

integration influences performance indirectly. The questions of whether and how the relationships of the organisation's dynamic capabilities affect performance and the intervention effect of product integration will be analysed in future work using a mediation model as explained by Hayes (2013).

3.3 Performance

Performance in this study is financial, and is defined as the firm's ability to generate revenue from their (output) products and echoes prior research measure of performance (Carrillo & Gaimon 2000; Ireland, Reutzell & Webb, 2005). Secondly, annual reports are used from a single accounting country which means that the revenue recognition accounting standards are measured in the same way and inform the capital markets as to the actual value of the highly technological company (Wagenhofer 2014). Effects of time and firm size are also used to articulate revenue as an accurate measure of real growth (Weinzimmer, Nystrom & Freeman 1998).

Companies that pursue growth through acquisition have a strong tendency to do well in the stock markets, but use accounting techniques that show the benefits of the acquisitions, but partially hide the source of the growth, i.e. the acquisition (Damodaran 2004). Market prices and accounting ratios are often used as an assessment of a firm's performance after mergers and acquisitions (Barkema & Schijven 2008; Léger & Quach 2009).

Within the software business, revenue is a key measure used to persuade the market, competition and the customers on the firm's strengths. In addition, there are strict rules regarding revenue recognition for new software products as outlined by PwC (2009). For example, SunGard (2010) explains that their revenue is highly diversified by both customer and product. The software manager will generally be targeted on revenues for the products they manage and the firm will report on these, for example, Oracle (2011) states they expect (and therefore measure) that software licence updates and support revenues will grow. Oracle (2011, p.3) also "*believe that an active acquisition programme is an important element of our corporate strategy...enhances the products...grows our revenues and earnings*". Teece (2007) agrees, explaining that revenue is a key measure in product planning, adding value to the customers that they will pay for. Therefore it is reasonable to use revenue as the most appropriate measure for performance. As the effect of product integration on performance is a focus, the total revenue will be collected as well as the revenue for software product (licence), software maintenance and software services.

3.4 Knowledge management

As Léger and Quach (2009) point out, a software product is largely intangible in nature, based on knowledge, and has characteristics peculiar to its portfolio. After an acquisition, the two companies have to combine resources in order to achieve organisational integration as well as portfolio integration. The literature examined related to mergers and acquisition in knowledge worker intensive organisations draws heavily on knowledge systems, and the management or integration of them (Augier & Teece 2009; Cloudt, Hagedoorn & Van Kranenburg 2006; Gates & Very 2003; Grimaldi & Torrisi 2001; Teece 2007). Barney (1986) in Cloudt, Hagedoorn and Kranenburg (2006, p.643) determines that it is the firm's ability to acquire, transfer and integrate the acquired firm's knowledge base that creates a sustainable competitive advantage.

The act of acquisition is the beginning of a large project, the majority of which is the integration of the acquired firm (Gates & Very 2003). The challenge is to create shareholder value, while at the same time managing issues in order to avoid value leakage. The maturity of the industry largely determines whether the acquisitive company is to understand how to integrate acquired knowledge, achieve technology integration and understand the non-financial benefits of acquisition. On examining the integration of a firm post-acquisition, Starkey, Tempest and McKinlay (2004, p.339) identify that there is a requirement to integrate the acquired firm's knowledge and use it towards competitive advantage. Barkema and Schijven (2008) agree, and argue that as the initial integration post-acquisition is suboptimal, subsequent acquisitions decreases an acquirer's performance and therefore force a re-organisation of the firm.

In his explanation of dynamic capabilities, Teece (2007) also finds that the ability to integrate and combine knowledge assets is a necessary capability in gaining performance. Following an acquisition, there is specialist knowledge within both the acquirer and the acquired firms, contributing to heightened levels of conflict. The ability towards co-ordinating, learning, product combining and reconfiguring is key to sustain long-term

performance (Teece 2007). Teece, Pisano and Shuen (1997) propose three management leadership skills that are required to sustain dynamic capabilities, namely co-ordination/integration, learning and reconfiguring. Together they form an “orchestration” process: an important managerial function is achieving semi-continuous asset orchestration and corporate renewal. Teece (2007, p.1320) defines orchestration in the context of the management functions identified (co-ordination/integration, learning and reconfiguring) is analogous to that of a musical orchestra conductor, although in the business context the “instruments” (knowledge assets) are themselves constantly being created, renovated, and/or replaced. Moreover, completely new instruments appear with some frequency, and old ones need to be abandoned. While flexibility is certainly an element of orchestration, the management capacity of orchestration as a concept implies much more.

The understanding of the basic business functions that make-up business administration and operations are understood (Teece 2007). The organisation’s competencies can be nurtured by inter-organisation links within the organisation structure, necessary in knowledge intensive firms. In the technology sector, within a software house, a large body of the non-administration staff are the technicians, analysts and programmers. Echoed in an ethnographic study of the company Xerox, Orr (2006) found an inter-organisation disconnect where the organisation’s managers did not really understand the work undertaken by the technicians. The knowledge workers domain is complex, and that of a software developer means understanding the palimpsest of the product, the layers that have gone before him as well as putting on his own. The divestment of people at Xerox, and hence the management of knowledge was poorly managed, Orr (2006, p.1813) comments on the drive to expense saving within an organisation as often being short-sighted, ‘management felt free to trade away functionality...for minor savings in expenses’. These actions uncovered by Orr (2006) point to poor capabilities with respect to knowledge management. The (dynamic) capabilities framework suggests to Augier and Teece (2009) that the scope of the manager includes resource selection decisions, but must also make reference to co-specialisation, or systems integration.

The most valuable assets inside the firm are knowledge related and thus non-tradable. The co-ordination and integration of such assets create value that cannot be replicated in a market. This establishes a distinctive role for managers in economic theory and in the economic system, according to Teece (2007). Managers seek new combinations by aligning co-specialised assets. The need to reconfigure when change occurs requires the allocation, reallocation, combination, and recombination of resources and assets. These are the key strategic functions of executives. Indeed, skills used to identify and exploit complementarities and manage co-specialisation are scarce (Augier & Teece 2009). Figuring out how to increase value from the use of people as well as products in the software business, (that the enterprise owns) involves understanding the granular detail of the firm’s asset base, and filling in the gaps necessary to provide superior customer solutions. This is where gap filling may involve building new knowledge bases (assets), or disposing of assets (people).

Management can make big differences through investment choice and other decisions. The dynamic capabilities framework endeavours to capture the key variables and relationships that need to be “manipulated” to create, protect, and leverage intangible assets to achieve superior enterprise performance and avoid the zero-profit trap. However, building and assembling tangible and intangible assets and effectuating change are seen as difficult. Success over time is likely to require achieving necessary internal creative destruction, possibly involving divestments to help sustain superior performance Teece (2007).

Léger and Quach (2009) tested the antecedents of the performance of mergers and acquisitions of software firms on an event basis. They posit that the most noteworthy criterion is inherent in the intangible nature of software products. Essentially based on knowledge, the combination of software firms is associated with certain economic phenomena that are specific to the information technology industry and that emerge from the characteristics of the product portfolio. More specifically, Léger and Quach (2009) ask whether the financial performance of the firms involved in a software business combination is influenced by and results from the characteristics of the new entity’s portfolio of software products. In line with this, it was decided to operationalise the Léger and Quach (2009) concepts of software compatibility and software complementarity, as criteria to explain the performance effect of mergers and acquisitions of software firms.

In light of the discussions on creating value in a high-tech knowledge intensive industry after major changes, such as acquisition, the four knowledge management areas selected to focus on are:

- Compatibility: the acquisition of firms with compatible software products (Léger & Quach, 2009), and the capability to leverage product knowledge to integrate the products.

- Complementarity: the acquisition of firms with complementary software products (Léger & Quach 2009), and the capability to leverage product knowledge to integrate the products.
- Competency: the acquisition of technical knowledge that is difficult to imitate or replicate (Léger & Quach 2009), and the capability to leverage product knowledge to integrate the products.
- Divestment: the divestment of people due to the acquisition and the divestment of products capability towards creation of superior performance (Teece 2007).

3.5 Compatibility

Software compatibility is defined as:

“the extent to which programs can work together and share data. In another area, totally different programs, such as a word processor and a drawing program, are compatible with one another if each can incorporate images or files created using the other. All types of software compatibility become increasingly important as computer communications, networks, and program-to-program file transfers become near-essential aspects of microcomputer operation” (Microsoft 2002, p.115).

In the context of a business combination, if the products owned by the firms involved in the merger are compatible, this should reduce investments the new entity needs to make to market a unified product portfolio. In addition, software compatibility can be perceived as a benefit for customers, since it allows the joint use of software and thus gives access to new functionalities without making any additional investments. In other words, in addition to conferring technical advantages, compatibility is directly related to financial investments: the more compatible the software products are, the lower the financial investments required to make them work together (Léger & Quach 2009).

Within the capabilities framework, a key to sustainable profitable growth is the ability to recombine and reconfigure assets as the organisation grows. Software product integration is ostensibly a reconfiguring; a combination of two or more products to achieve a new product offering. This then is the innovation, the assessment of the markets, the reconfiguring of the technology and the evolution of something new (Teece 2007, p.1335). This research is centered on the value to the firm from the specific innovation of product integration; in software business terms, organic growth (SunGard 2010).

Future work will collect data on acquisitions where the software is compatible to the existing portfolio. It is expected that the compatibility of the products held by the new entity will have an impact on the performance of the firm and on product integration.

3.6 Technology complementarity

Software complementarity is defined as compatible programs that are based on the same standards, and require few or no investments to make them work together (Léger & Quach 2009). In post mergers and acquisition research of the software industry, Léger and Quach (2009) found that the performance of the acquisitions in terms of price/book value ratio is impacted positively when the portfolio acquired is technologically complementary to that of the acquirer. They also find the acquirer pays a premium for software portfolios that are compatible and complementary, but the financial markets neglect the characteristics of the portfolio purchased. This implies that the lack of market attention may impact the product integration capability through lack of management/ business drive.

In addition, Makri, Hitt and Lane (2010) found that too much technological similarity, or too much difference, reduces innovation when they investigated invention outcomes post mergers and acquisition on technology firms. However, based on their model on the relatedness of the acquirer and acquired firms, and the invention performance achieved, their findings show that the technology complementarity of the firms is a key to success. Whilst the Makri, Hitt and Lane (2010) knowledge measures distinguished between science and technology, the definition of knowledge complementarity is analogous: Technological is how components are linked together and Scientific is the core design concepts and how they are implemented. Whereas Makri, Hitt and Lane (2010) measure invention and not innovation, their findings informs this study, since invention is required as a first step

towards innovation: in order to gain revenue from it. The Makri, Hitt and Lane (2010) definition of invention is that which is unexploited in the marketplace: invention as the solution of a puzzle, an invention in a lab, and the process of recombination, re-combining in a novel way.

In a study on the unification and aggregation factors that have a positive effect on innovative performance of technology mergers and acquisitions, Cloudt, Hagedoorn and Kranenburg (2006) found that post mergers and acquisitions, the unification of two knowledge bases can provide opportunities for synergies in the firm's future research and development, whilst also reducing redundant or duplicate R&D efforts which can provide a larger research base to finance costs. An important factor in the merger of two firms is their relatedness in terms of particular fields of technology that the acquiring firm shares with the acquired firm, in other words their complementarity. Cloudt, Hagedoorn and Kranenburg (2006) identify two types of complementarity; one, the relatedness of the mergers and acquisitions in terms of the company products and markets concern the industry-aspect; two, on the technological complementarity (relatedness) referring to firm-specific aspects such as technological disciplines (computing infrastructure for example) and engineering capabilities (software languages for example).

From an organisational learning perspective, a positive effect lies in the ability to better evaluate and utilise complementary externally acquired knowledge, rather than uncomplimentary externally acquired knowledge. This is based on the idea that a firm's absorptive capacity depends mainly on its level of knowledge in a specific field. If the knowledge base of the acquirer is not sufficiently adapted to the acquired knowledge, the absorption process becomes very difficult. Therefore, unrelated technologies often require a radical change, which can easily be counterproductive. However, technological knowledge and engineering capabilities that are too similar to the already existing knowledge of the acquiring company will contribute little to the post mergers and acquisitions innovative performance (Ahuja & Katila 2001; Hitt et al. 2009).

Future work will collect data on the complementarity of the products and technology acquired. It is expected that there will be a positive impact on performance and product integration when the acquired products are complementary.

3.7 Competency

The acquisition of competencies in the software industry is defined by Léger and Quach (2009) as the acquisition of technical know-how or specific technologies, which are difficult to imitate or copy and which would require a corresponding financial investment. Gammelgaard (2004) argues that access to competence (non-tradable, unique resources) is a motive for mergers and acquisitions. Ahuja and Katila (2001) agree that acquisitions are an important part of the business process of redeploying resources into more productive uses and through the acquisitions, firm specific assets housed within one organisation are merged with assets in another to improve productivity.

An early element of the dynamic capabilities framework point to the ability to reconfigure and protect knowledge asset competencies with the aim of achieving a competitive advantage (Teece 2007). Léger and Quach (2009) posit that many prior studies, as well as financial literature, have analysed mergers and acquisitions with relation to shareholder value creation. One of the main performance antecedents identified by Léger and Quach (2009) in post-merger performance in the software industry, is the potential to acquire competencies. The acquisition of competencies has the goal of acquiring skills that are difficult to develop internally or would take too long, meaning that this factor may be crucial to the success of the new entity.

An important managerial function is achieving resource orchestration and corporate renewal. This involves achieving asset alignment, realignment, and redeployment. It is necessary to minimize internal conflict as well as to maximise competencies and productive exchange inside the firm. Redeployment and reconfiguration may also involve asset-realignment activities. Redeployment can involve transfer of the non-tradable resource competencies to another organisation or geographic location (Teece 1977, 1980). Helfat and Peteraf (2003) suggest that competency redeployment takes one of two forms: the sharing of the competency between the old and the new firms (or product lines), and the geographic transfer of the competency from one market to another.

In fast moving business environments open to global competition, the orchestration capability often relies on owning the knowledge assets, as well as to enhance, combine and reconfiguring the difficult-to-replicate assets (Augier & Teece 2009; Grimaldi & Torrioni 2001; Teece 2007). Within a software firm, the products produced

are referred to as creative (Grimaldi & Torrissi 2001), and as such the acquired resources have a lot of tacit product knowledge, hence being difficult to replicate.

A key challenge for companies is not just to acquire knowledge bases (competencies) to expand the firm's existing knowledge base, but also to integrate the knowledge workers in order to improve the post-mergers and acquisitions innovation opportunities (Ahuja & Katila 2001). Hitt et al. (2009) also warn that, post mergers and acquisitions, a positive innovation outcome is dependent on organisational learning (through repetition). Integration of the acquired competencies is key to knowledge management, and learning from the process aids selection of future acquisitions and improves future integrations, thereby giving greater success. The integration of a knowledge base that is of a relatively large size can disrupt existing innovative activities, and render the different integration stages more complex, more time consuming and full of risks (Clodt, Hagedoorn & Kranenburg 2006, p.644). Due to such problems, integrating a relatively large knowledge base requires additional resources to be devoted to integration activities, leaving fewer resources for the actual innovative endeavour (Ahuja & Katila 2001). Thus, it is expected that with the integration of a relatively large knowledge base, fewer resources will be available for innovative activities, which has a negative impact on the acquirer's post mergers and acquisition innovative performance.

Future work will collect data on whether competencies were specifically sought after as part of the mergers and acquisition. It is expected that the acquisition of competencies will have a positive effect on product integration, neutral on performance.

3.8 Divestment

Divestments in the context of this study refer to changes in the scope of the firm (Barkema & Schijven 2008) and the firm's capability towards divestment, which is that of redeployment and reconfiguration, and involves the firm's decisions regarding asset realignment (Capron, 1999 in Capron & Mitchell 2009; Teece 2007). The assets under review are human and product, thus the definition of divestment is firstly, the human resources divestment (redundancy) that is directly attributed to merger and acquisition activity. Secondly, it is the product divestments (disposals) (Pennings, Barkema & Douma 1994).

Divestments of products and people are used to demonstrate asset shedding and competency divestment. The freeing of dying systems and technologies allow for removal of innovation limitations arising from established frameworks (Teece 2007, p.1335). Teece (2007) argues that divestments are necessary. Over time successful enterprises will develop hierarchies and rules and procedures (routines) that begin to constrain certain interactions and behaviours unnecessarily. This means that inertia and other rigidities stand in the way of improved performance. This in turn implies that, less well-resourced enterprises end up winning business.

In order to solve problems and avoid limitations in innovation, managers that divest assets may end up with a competitive advantage Teece (2007). Post-acquisition, a firm may need to reorganize and reconfigure its people (assets) and also consider the products and boundaries of the firm that are no longer viable. Especially in a technological setting, the divestiture may be fragile and exiting the firm boundaries may not be obviously rational (Hitt *et al.* 2009; Teece 1986, 2007). Barkema and Schijven (2008) found that post-acquisition, divestment activity (people and products) does tend to increase at time of organisation re-organisation, and impacts performance. Divestments are part of the product portfolio restructuring and are common when there are major changes in the scope of a firm through, for example mergers and acquisitions. A regular occurrence in highly acquisitive firms, undertaking organisational restructuring refers to the recombination of existing company departments leaving the scope of the firm unchanged and are required to unlock synergies contained within the acquisition (Barkema & Schijven 2008). In support of this, Damodaran (2004) found the divestiture rate of acquisitions rises to almost 50% of prior acquisitions made, suggesting that few firms enjoy the promised benefits from those acquisitions. The bottom line on synergy is that it exists, or, is extracted in relatively few mergers and acquisitions, and therefore often does not measure up to expectations

Within dynamic capabilities, Teece (2007) explains that an important managerial function is achieving semi-continuous asset orchestration and corporate renewal, including the redesign of routines. This is because the sustained achievement of superior profitability requires efforts to build, maintain, and adjust the complementarity of product offerings, systems, routines, and structures. Inside the enterprise, the old and new

must complement. If they do not, business units (products and people) must be disposed of. Capron (1999 in Capron and Mitchell 2009) finds that asset divestiture and resource deployment can contribute to performance.

Since the divestment of assets post-acquisition is a common feature, and it may impact the firm's ability to create value with product integration, data will be collected on divestments of products and any divestment of people that is directly attributed to acquisition, as opposed to divestment for cost cutting or due to organisation restructure.

It is expected that the divestments of product will positively affect performance and the divestment of people (with their tacit knowledge) to negatively affect the product integration.

3.9 Integration experience

An acquisition is usually not an isolated event, but merely one part of an overarching sequence of acquisitions collectively aimed at implementing a corporate strategy (Barkema & Schijven 2008). The integration of each of these acquisitions requires considerable time and effort, thus often causing the burden on the acquirer's management to increase as its string of acquisitions grows (Penrose 2009). The crucial transforming organisation behaviour identified by Augier and Teece (2009) has been integration management by highly skilled managers and people with capacities to combine and integrate.

The firm is a repository of capabilities and knowledge (Augier & Teece 2009; Penrose 2009) and learning is central to its growth. In order to build profit, the firm builds on routines that are recurrent patterns of action. Seeking strategies based on improving performance, routines and processes evolve, becoming part of the firm's knowledge creation and learning.

Mergers and acquisitions add a new dimension to the firm. An argument posed by Barkema and Schijven (2008) is that even with pre-integration preparation, initial integration is nevertheless, suboptimal. As a result, acquisitive growth decreases an acquirer's performance, eventually forcing it to engage in organisational restructuring to more fully unlock the synergistic potential. The problem is expanded further over time and with acquisition propensity, particularly those acquisitions where the rationale for their selection has been scale, scope or transfer of capability. In studying the effect of multiple acquisitions in conjunction with the number of re-organisations over time, they have shown that organisation change is used to increase performance.

More recently, however, Barkema and Schijven (2008) assert that the bulk of the research attention has shifted toward a second contingency that arises in the post-acquisition, or implementation, stage of the acquisition process: organisational fit. The argument is that, although strategic fit is a necessary condition for synergy realisation, it merely creates value potential that can only be realised through effective integration of an acquired firm. Moreover, integration enhances acquisition performance. Hence, after an acquirer selects and acquires a firm with synergistic potential, it is up to the acquirer to unlock as much of this potential as possible by building sufficient organisational fit. However, this is a complex task that requires considerable management time and attention. The integration of each of these acquisitions requires considerable time and effort, often causing the burden on the acquirer's management to increase as its string of acquisitions grows (Penrose 2009), thus suggesting that the role of organisational fit extends far beyond the level of the individual acquisition (Barkema & Schijven 2008).

A key theme of behavioural theory is that repeated tasks are routinised (Augier & Teece 2008); Barkema and Schijven (2008) assert that the restructure 'routine' is necessary to gain synergies. Re-organisation is common after a major event such as an acquisition. In an ethnographic study of a software firm, Ager (2011) noted that this was not an extraordinary exercise. It was done, in order to realise the synergies sought by the deal.

Barkema and Schijven (2008) maintain that, because of the number of acquisitions a firm makes and the subsequent re-organisations that it undertakes, there is a corporate learning which makes the task increasingly routinised. In turn this lowers the demands on the firm's management due to increased experience rather than through bounded rationality, meaning that a firm has "limited information, attention, and processing ability" (Greve, 2003, cited in Barkema & Schijven 2008 p.697). An acquisition is usually not an isolated event, but merely one part of an overarching sequence of acquisitions collectively aimed at implementing a corporate strategy.

In terms of product integration, the strategic, organisational, and human resource decisions made by management are at the heart of enterprise performance. Success requires that managers behave in an intensely entrepreneurial manner and build into their organisation the capacity to transform and reconfigure as opportunities and competitive forces dictate. Such capabilities, if built, constitute the dynamic capabilities required. Not many CEOs have the necessary skills, and fewer still succeed in building them into their businesses. The dynamic capabilities framework developed in the field of strategic management highlights the growing importance of entrepreneurial management (Augier & Teece 2009).

In light of the literature reviewed, within a highly acquisitive software firm, it is expected that the number of acquisitions made will impact the organisation experience. Also it is expected that the organisation will learn from their post-acquisition experience in the form of organisation restructures, thus affecting the performance of the firm, particularly in the subsequent year(s).

4. Conclusions

In extant work, researchers have almost invariably treated acquisitions as isolated events; implicitly assuming that an acquirer can start with a clean slate every time it acquires. In reality, however, an acquisition usually represents merely one element in a broader sequence of acquisitions collectively intended to implement some corporate strategy (Barkema & Schijven 2008; Damodaran 2004).

4.1 Knowledge management

The examined literature related to mergers and acquisition in knowledge worker intensive organisations draws heavily on knowledge systems and the management or integration of them (Augier & Teece 2009; Cloodt, Hagedoorn & Van Kranenburg 2006; Gates & Very 2003; Grimaldi & Torrisi 2001; Léger & Quach 2009; Teece 2007). Figuring out how to increase value from the use of the people as well as products in the software business, that the enterprise owns, involves understanding the granular detail of the firm's asset base, and filling in the gaps necessary to provide superior customer solutions. This is where gap filling may involve building new knowledge bases (assets), or disposing of assets (people). It was found that the acquisition of compatible product(s) does affect product licence revenue in the longer term and reduces the firm's ability to innovate. This may imply that the need for the manager to determine how to use the acquired product is reduced if it is already compatible, i.e. *“the extent to which programs can work together and share data. In another area, totally different programs, such as a word processor and a drawing program, are compatible with one another if each can incorporate images or files created using the other. All types of software compatibility become increasingly important as computer communications, networks, and program-to-program file transfers become near-essential aspects of microcomputer operation”* (Microsoft 2002, p.115).

As the act of acquisition is the beginning of a large project, the majority of which is the integration of the acquired firm (Gates & Very 2003) in his explanation of dynamic capabilities, Teece (2007) finds that the ability to integrate and combine knowledge assets is a necessary capability in gaining performance. Following an acquisition, there is specialist knowledge, within both the acquirer and the acquired firms, contributing to heightened levels of conflict. The ability towards co-ordinating, learning, product combining and reconfiguring is key to sustain performance (Teece 2007). It was found that acquiring and divesting competencies (people) affects the firm's ability to innovate, as might be expected. This perhaps reflects the finding of Teece, Pisano and Shuen (1997) who propose that it is management leadership skills that are required to sustain dynamic capabilities; namely co-ordination and integration, learning and reconfiguring that make the difference. The most valuable assets inside the firm are knowledge related and complex. Within a software house, a large body of the non-administration staff are technicians, analysts and programmers. The co-ordination and integration of such assets create value. The post-acquisition findings will be grouped into asset acquisition and divestment.

4.2 Integration experience

Barkema and Schijven (2008) find that the post-acquisition integration and restructuring cycles evolve over time, as a firm gains experience with acquisitions and restructuring. They note that it is quite common for firms

to use organisational restructuring as a means of experimenting with structure to find more promising configurations (Barkema & Schijven 2008; Karim 2006). The term “Product Integration” is directly related to the transformation of the software product portfolio held by the firm, post mergers and acquisitions (Léger & Quach 2009; Nambisan 2002a). As the acquisition is usually not an isolated event, but just one part of an overarching sequence of acquisitions collectively aimed at implementing a corporate strategy (Barkema & Schijven 2008), a count of the number of organisation restructures will be used for the integration experience as a measure towards success of product integration.

As mergers and acquisitions add a new dimension to the firm, an argument posed by Barkema and Schijven (2008) is that even with pre-integration preparation, initial integration is, nevertheless, suboptimal. As a result, acquisitive growth decreases an acquirer’s performance, eventually forcing it to engage in organisational restructuring to more fully unlock the synergistic potential. In studying the effect of multiple acquisitions in conjunction with the number of re-organisations over time, they found that organisation restructure is used to increase performance.

The literature suggests that the benefits of acquisition experience enables an acquirer to increase its acquisition performance, and indicates that firms can develop a restructuring capability, although extant theory predicts that it is difficult for them to do so, since restructurings occur infrequently and are highly heterogeneous and causally ambiguous (Zollo & Winter 2002 in Barkema & Schijven 2008). Although organisational restructuring tends to be a traumatic event that leads to a substantial dip in firm performance in the short term (Amburgey, Kelly & Barnett 1993; Greve 1999, cited in Barkema & Schijven 2008), Barkema and Schijven (2008) assert that in the long term it enables a firm to more fully unlock the synergistic potential of its acquisitions and thus, to increase its performance to higher levels than before. This study echoes the difficulty, finding that organisation restructures do not aid overall revenue but do aid product licence revenues. Conversely, they reduce innovation efforts.

Restructuring experience impacts the number of product integrations positively in the short term and negatively in the longer term, although not significantly. This may reflect the restructures’ impact on the combination and integration capabilities that impact in the longer term. This is in line with the dynamic capabilities model explanation from Augier and Teece (2009), that managers effectuate the deployment and redeployment of resources, typically in response to price signals. In short, the strategic, organisational, and human resource decisions made by management lie at the heart of enterprise performance. Success requires that managers behave in an entrepreneurial manner, and build in the capacity to transform and reconfigure as opportunities and competitive forces dictate. Not many CEOs have the necessary skills, and fewer still succeed in building them into their businesses, which would go towards an explanation of the lack of performance in terms of revenue and product integration.

4.3 Recommendations for Further Research

This study suggests that it is important for future research to move beyond the notion of acquisitions as isolated events, toward recognising their embeddedness in sequences intended to implement a corporate strategy, which allows for a long-term and dynamic approach to studying their performance effects.

Future work proposed is to design a conceptual model, and collect empirical data that reflects the dynamic capabilities model, specifically the third stage (enhance/ reconfigure), in order to describe, explain and account for the effect of product integration on the firm’s performance. The study will focus on heavily acquisitive firms, as acquisition intensity has significant impact on the organisation learning activities, performance outcomes and portfolio scope (Barkema & Schijven 2008). In practice, public software firms that are highly acquisitive are competing in larger markets and need to recombine and reconfigure to maintain competitive (Damodaran 2004; Nambisan 2002a; Teece 2007). Prior research has explained that highly acquisitive organisations are able to learn through repetition of routines and processes. However, implementations may be limited as more acquisitions are added, because the managerial resources are increasingly tied up (Augier & Teece 2009; Barkema & Schijven 2008; Léger and Quach 2009).

After an acquisition, firms integrate to gain performance. The study will aim to test whether a further stage is required towards attaining performance, which is to integrate the acquired software products. The research theory will be tested with panel data of acquisitive software firms that have made multiple acquisitions over a

decade. Prior research has often used either a single event as the unit of analysis (event driven), or has highlighted change over one, two or three years (Barkema and Schijven). In line with prior research, a (longitudinal) ten year dataset is sufficient (Ahuja & Katila 2001; Barreto 2009; Cloudt, Hagedoorn & Van Kranenburg 2006). A longitudinal study of firms is required to explain the extent to which software firms reconfigure and recombine, i.e. that product integration happens, and the product integration has an effect on performance.

Concentrating on dynamic capabilities within organisational behaviour theory, the research question centres on the factors that impact product integration post mergers and acquisitions, and whether the performance potential from a software product acquisition is enhanced with, or via, product integration. The ability to realign and innovate will increase performance over the long term (Pierce & Teece 2005).

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