

Redefining the role of SMEs in value creating ecosystems: Evidence from case studies

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ABSTRACT

SMEs form a significant component of a country's economy due to their potential to help address issues such as poverty, income inequality and unemployment (Ayyagari, Beck and Demirguc-Kunt, 2007). Despite their importance, they face numerous challenges, resulting in very low success rates of newly established SMEs (Ropega, 2011). Relationships with large companies are widely considered a critical aspect of small and medium enterprise (SME) support, as it offers these businesses large and stable markets that they need to grow. Furthermore, there is a growing recognition that relationships between small and large businesses are of a strong, symbiotic nature. Primarily driven by digitisation and increased connectivity, relationships between businesses are becoming increasingly fluid, interdependent and collaborative (Kelly, 2015; Kelly and Marchese, 2015).

The increasingly dynamic business environment conceived the concept of business ecosystems. Business ecosystems provides a powerful new lens that captures the growing importance of relationships, partnerships, networks, alliances and collaboration between businesses. However, the capabilities of SMEs to successfully participate in ecosystems are not yet fully developed. There is a need provide a formal approach to mature SME participation within ecosystems. This paper represents the first steps towards achieving this goal, by determining the role that SMEs are suited to play within ecosystems, as well as determining the capabilities that they would require in order to fulfil this role.

Many businesses have been successful at creating ecosystems where they interact with a large number, often smaller participants. By using a reverse engineering process, knowledge and insights are extracted from the existing ecosystems. Firstly, the existing ecosystems are categorised according to their value creation process. Five different types of value creating ecosystems exist, namely *integration ecosystems*, *collection ecosystems*, *matching ecosystem*, *data collection ecosystem*, and *sequenced ecosystems*. For each of these ecosystems, the members are identified along with the role they play in the ecosystem. By comparing the capabilities of each of these roles with the capabilities of SMEs, it is concluded that the SMEs are best suited to fulfil the role of the niche player – or supporting partner. However, for them to successfully participate and contribute value, they would have to possess certain capabilities. Future work will incorporate these capabilities into the support infrastructure that can be offered both internally and externally to SMEs.

Key words: Small to medium-sized enterprise, business ecosystems, SME support, value creation

INTRODUCTION AND PROBLEM STATEMENT

Poverty, inequality and unemployment are issues that affect people world-wide. In developing countries however, the effects thereof are even more evident. In South Africa, unemployment rates are as high as 27,7% and even higher amongst the youth (StatsSA, 2017). For any public or private leader who is concerned with fighting these issues, ensuring the success of small- and medium enterprises (SMEs) is critical (Jenkins, 2015).

Likewise, larger and more mature businesses are starting to recognise how integral the smaller players are to achieve their own commercial objectives. The traditional closely monitored, contractual agreements between businesses are continuously being challenged by new imperatives such as learning, agility and renewal. SMEs are increasingly able to offer the flexibility, deep specialisation and innovation capabilities that large businesses require in business partners (Kelly and Marchese, 2015).

The linkages between small and large businesses and the coordination across several firms is a complex endeavour. For the most part, large businesses are not equipped to engage with companies of such a small nature and on such a large scale (Kelly and Marchese, 2015). This complexity is reciprocated by SMEs, who traditionally suffer from resource constraints which potentially restricts them from successfully interacting with larger businesses (Estanyol and Lurgi, 2011; Weiss and Minshall, 2014). In order to adapt, more companies are starting to establish or utilise platforms that facilitates greater levels of connectivity and collaboration between a larger number of businesses or entities. These platforms are becoming powerful environments where rich ecosystems of various resources and participants are cultivated (Hagel, 2015; Kelly and Marchese, 2015).

Ecosystems are presenting many opportunities for smaller organisations and often individuals, who together can serve markets beyond the capabilities of any

single organisation (Kelly, 2015). The capabilities of SMEs to successfully participate and interact with larger enterprises are however, not yet fully developed. There is a need to mature SME participation in dynamic ecosystems, by providing support that is designed around the needs of SMEs and the core capabilities of the ecosystem, strategic partners and shared resources.

The importance of small businesses

For the past decades the term "SME" has been widely and informally used to describe the segment of businesses that occupy the space between microenterprises and large firms. Despite the small size of SMEs, they are at the core of a country's economic development. SMEs play the dual role of contributing to the gross domestic product (GDP) of a country as well as encouraging entrepreneurship and creating jobs on a large scale (Storey, 1994; Berry *et al.*, 2002; Gibson and van der Vaart, 2008).

In developing countries where unemployment and poverty are issues that affect the majority of its people, the creation and success of SMEs are all the more important. Evidence supporting their contribution in these economies varies significantly, but it provides an overall confirmation of their important role. In South Africa, the believed contribution to the GDP varies yearly and ranges between 36% and 57% in the early 2000's, to 45% in 2014 and 36% in 2015 (Fatoki and Odeyemi, 2010; Kongolo, 2010; Kelley, Singer and Herrington, 2015; Herrington and Kew, 2016). SMEs' contribution to employment ranges from 84% in the early 2000's, to between 56% and 61% in 2010 (Berry *et al.*, 2002; Fatoki and Odeyemi, 2010).

Regardless of the growing recognition of the importance of SMEs, the conditions under which they must start, operate and grow remain challenging. The difficulty to access finance, especially during early stages of development, and the lack of managerial expertise are only some of the many barriers that prove too much for SMEs to handle. In South Africa for example, it is estimated that 75% of new businesses will not survive beyond the first two years of operation (Fatoki and Odeyemi, 2010; Herrington, Kew and Kew, 2014). It is for these reasons that small business support features on the agendas of nearly every major regional and global development institution (Jenkins, 2015).

The emergence of ecosystem behaviour

Alliances and partnerships have always played an important part in businesses. They depend on various types of support from a chain of partners and suppliers to create and deliver value to customers. The chain of value creation effectively allows the business to focus only on their core competencies while their carefully constructed external partnerships focus on the remaining functions (Kanter, 1994; Kelly and Marchese, 2015).

The emphasis on the word "chain" in *value chain* portrays a powerful metaphoric logic that depicts how value is added within one discrete entity before being sold to the next. But in this fast changing competitive environment, the fundamental logic of value creation is changing. Increasingly, value is being created not only

within firms, but rather within the rich interactions between them (Normann and Ramirez, 1993; Kelly and Marchese, 2015). Particularly driven by digitisation and increased connectivity, businesses are gaining capabilities to utilise assets that they do not own, to engage with a larger amount of participants and to coordinate more complex activities. As a result, value creating partners are developing relationships that are increasingly fluid, interdependent and collaborative. The Mahindra Group® for example, employs more than 200,000 people globally. Suppliers and internal businesses alike are linked in jointly owned initiatives within their global supply chain. They effectively have a supply chain where collaboration, learning and creativity are coordinated across the diversified group. (Kelly, 2015; Kelly and Marchese, 2015).

When studying the increasingly dynamic business environment, researchers identified important parallels between the behaviour of businesses and the behaviour of organisms found in natural ecosystems (Moore, 1993). The concept of natural ecosystems was first described in the 1930s as a localised community of living organisms who interact with each other and their environment. These organisms compete, collaborate and co-evolve. They influence each other, their terrain and they adapt together to external influences (Danone, 2012). The ecosystem perspective provides a powerful new lens that captures this transformation in the business landscape, by emphasising the growing importance of relationships, partnerships, networks, alliances and collaboration (Kelly, 2015).

The diverse usage of the term and the lack of a formal definition have induced some critique from researchers. The biological parallels remain mostly suggestions without any empirical support or correspondence rules (Oh *et al.*, 2014). As a result, ecosystems could easily be dismissed as only another management buzzword. However, the rapid spread and adoption of the concept points to a practical utility that can contribute real value to the business world. At a minimum, ecosystems provide a powerful metaphor that will make it easier to explore and understand this abstract concept (Kelly, 2015).

Problem statement

Relationships with large companies are widely considered a critical aspect of SME support, as it offers these businesses large and stable markets that they need to grow (Jenkins, 2015). Many ecosystems exist which have been successful in establishing and maintaining relationships between small and large businesses. These ecosystems are proof of the value that this type of relationship is able to offer both parties. Yet, many of these ecosystems have evolved without formal planning.

When considering the role that SMEs play in a country's economy, especially in developing countries, it serves as a validation as to why it is important to support these relationships. For this reason, the main objective of this research is to provide a formal approach to support SMEs to successfully interact with larger companies in ecosystem environments. This paper represents the first step towards reaching this objective, by determining the role that SMEs are suited to

play within ecosystems, as well as determining the capabilities that they will require in order to execute this role successfully.

METHODOLOGY AND OBJECTIVES

Many businesses have been successful at creating partnerships and interacting with a large number, often smaller participants. The reasons for these partnerships and the ways in which the partnerships are facilitated differ in each case. Each of these cases are however, able to provide valuable insights into understanding the role of the smaller players within these ecosystems. Before a structure can be designed to support SME participation in ecosystems, it is critical to understand their role and the value that they are able to contribute.

In an attempt to extract the knowledge and insights from the existing, successful ecosystems, a reverse engineering process will be used. This process is displayed in Figure 1. Reverse engineering is a powerful tool to increase the overall comprehensibility of an existing, functional system. Popular in software analysis, reverse engineering is described as the process of developing a set of specifications for a complex system by an orderly examination of existing cases of that system. The goal of reverse engineering is to take an existing system and to generate a new system from it, for a different application (Rekoff, 1985; Byrne, 1992).

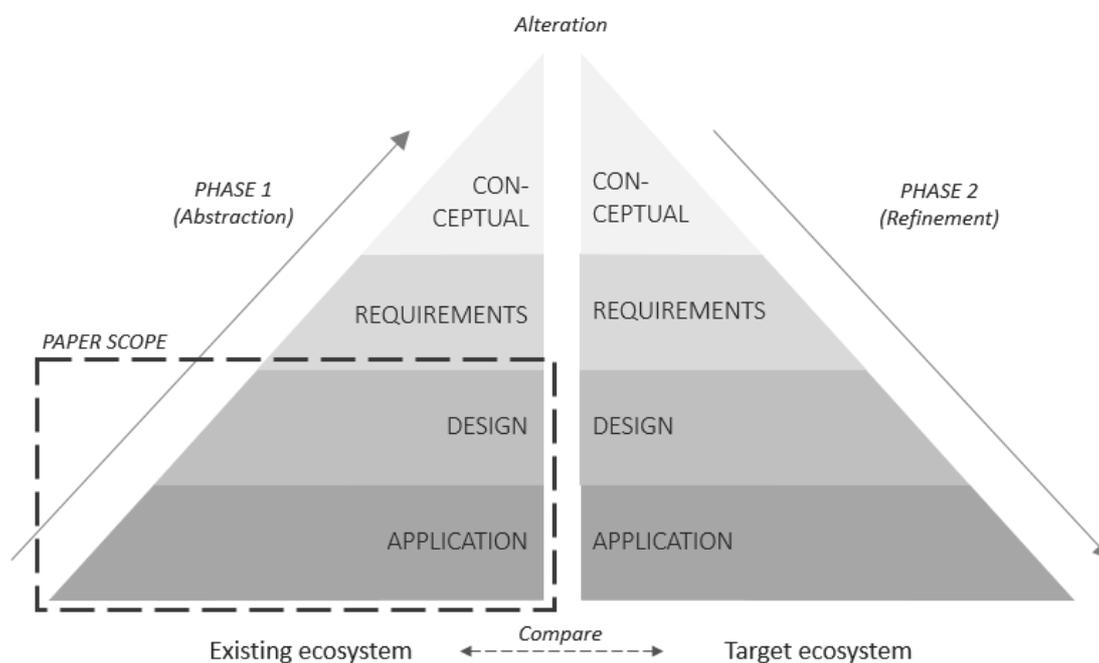


Figure 1: Reverse engineering process. Adapted from (Byrne, 1992)

As displayed in Figure 1, the process consists out of two distinct phases. The first phase is to identify the system's current components and interrelationships through an increasing level of abstraction. The second phase is to represent the system in a different form through an increasing level of refinement, by altering the findings of the first phase (Chikofsky and Cross, 1990). The process

comprises four different levels of abstraction, where *conceptual level* is the highest level, and *application level* is the lowest level.

The scope of this paper, as shown in Figure 1, is to complete the *application level* and the *design level* of the first phase of this process. These two levels are defined by the following characteristics (Byrne, 1992):

- The *application abstraction stage* describes the operational characteristics; and
- The *design abstraction stage* describes system characteristics such as architectural structure, system components and interfaces between components;

The main objective of this paper is to gain new insights into the value that SMEs will be able to contribute to a dynamic and collaborative partnership with larger companies. By applying these two levels, the following research questions were constructed to guide this paper:

Research question 1: What different types of ecosystems exist?

Research question 2: What is the role of each member each type of ecosystem?

Research question 3: Which role within the ecosystem is SMEs best suited for?

Research question 4: What are the capabilities that SMEs would require to fulfil this role?

Figure 2 depicts the steps that are performed to reach the objectives of this paper.

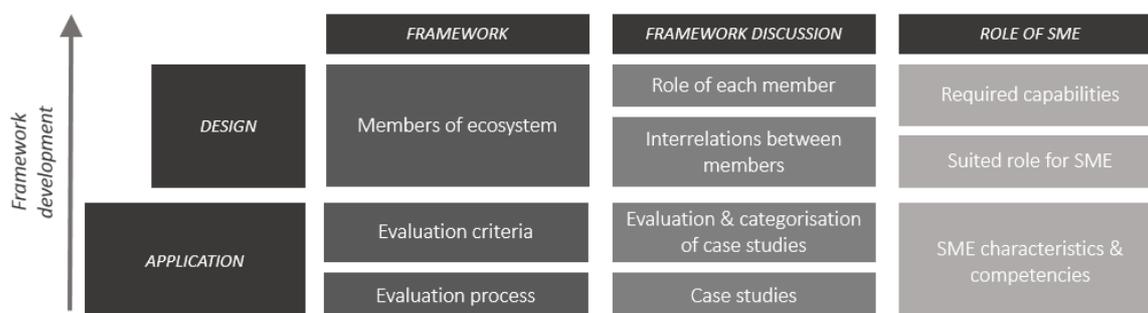


Figure 2: Framework development

FRAMEWORK DEVELOPMENT

The following section present the framework containing two levels, namely an Application level and a Design level. The framework includes the evaluation criteria as well as the components that can be found within each ecosystem.

Evaluation process

The criteria that is used to categorise the dynamic ecosystems are carefully selected to align with the objectives of this paper. In order to determine the value that SMEs will be able to contribute to the ecosystem, the ecosystems are

categorised according to their value creation process. A simple value creation process, displayed in Figure 3, will be used to determine the criteria according to which the ecosystems are categorised.



Figure 3: Value creation process. Source: (Bowman and Ambrosini, 2000)

Evaluation criteria

Each step in the value creation process represents a criterion according to which the ecosystems are evaluated and categorised. Each criterion describes a specific attribute of the ecosystem within the process. The key criteria, in accordance with the value creation process, are described in Figure 4.

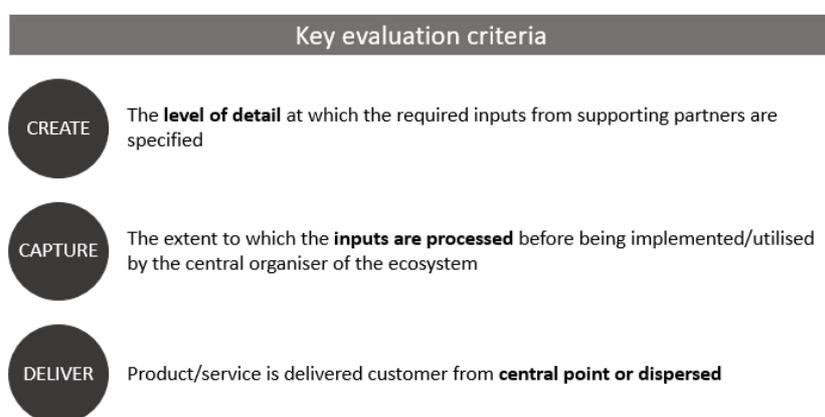


Figure 4: Key categorisation criteria

Ecosystem members

Ecosystem behaviour emerges when multiple businesses are connected and interact dynamically. As a result, greater levels of connection and collaboration is required within ecosystems. More businesses are creating ecosystems on top of new types of digital platforms. These platforms are deliberately designed to attract the participation of a large number of players, while providing an infrastructure to impose standards on the system (Hagel, 2015; Kelly, 2015). The ecosystems that are created on top of these platforms come in many varieties. They all however, comprise the same key members. Though the nature of their roles differ in each type of ecosystem, they can each be identified from the same core characteristics. The members of an ecosystem include the following:

- i. **Keystones**, also referred to as platform leaders or ecosystem leaders. They are arguably the most significant member of the ecosystem. The keystone regulates the overall function of the ecosystem, influencing the success of all the other members, including its own. Keystones exert substantial power within the ecosystem, thus demanding a greater share of overall profits (Moore, 1993; Cusumano and Gawer, 2002). The

keystone often also provides and owns the platform which other members in the ecosystem could utilise (Iansiti and Levien, 2004);

- ii. The **niche players** support the keystone. They form the great majority of the ecosystem by contributing the largest portion of innovation and created value. Niche players have specialised functions which differentiates them from other members of the ecosystem (Cusumano and Gawer, 2002). Niche players focus on their own, specialised value offering by utilising the provided platforms, as well as the products from other niche players within the ecosystem (Iansiti and Levien, 2004); and
- iii. The **customers** are the buyers or the users of the value that the ecosystem offers. It is important to identify the consumer of the ecosystem, as they are increasingly becoming more active participants in the value creation process (Eggers and Muoio, 2015).

FRAMEWORK DISCUSSION

Ecosystems in a business context is derived from biological sciences. It describes a *dynamic community of diverse, independent businesses and individuals who interact with one another to create and capture new value* (Sahasrabudhe *et al.*, 2012; Kelly, 2015). The word “ecosystem” is used broadly and inconsistently in the business world, resulting in an over-used and often confusing concept. As pointed out by Sahasrabudhe *et al.* (2012), this confusion arises from the fact that ecosystems exists in a broad array of shapes and sizes, and the many forms that exist have not yet been properly defined.

In attempt to reduce this confusion, various case studies of existing ecosystems are evaluated according to the criteria displayed in Figure 4. This evaluation consequently groups the ecosystems according to their value creating processes. Each of the case studies used in this paper have successfully accomplished the dynamic interaction between multiple members. A full list of the case studies are included in *Appendix A*. The evaluation of these case studies resulted in five categories. The categories include *integration ecosystems, collection ecosystems, matching ecosystem, data collection ecosystem, and sequenced ecosystems*. A description of each of these categories, along with the relevant case studies, are included in .

Table 1: Ecosystem categories description

Category	Ecosystem description	Case Studies
Integration ecosystem	Several businesses integrate their offerings to provide a more attractive offering to the downstream customer.	Discovery
Collection ecosystem	Information in the form of contributions, innovations or solutions to problems are gathered from various sources, and incorporated into the key value offering.	Wikipedia; Kickstarter; GoFundMe; LEGO; Kaggle; Innocentive; Linux

Matching ecosystem	Suppliers are connected with customers to fulfil a specific purpose.	Uber; Airbnb; TutorVista; Alibaba; Taobao
Data collection ecosystem	Data that is generated from the business activities in the ecosystem is collected, analysed and used for a specific purpose.	Google; Discovery AdWords; American Express; Belk
Sequenced ecosystem	A series of activities are performed in a sequential manner to contribute to the key value offering.	General Motors; SABMiller; Woolworths; Coco-Cola; Sabco; Toyota

Integration ecosystems

Integration ecosystems arise when several businesses integrate their offerings to provide a more attractive product or service to the downstream customer. The keystone plays a central role in the ecosystem, as displayed in the partnering structure in Figure 5. The keystone typically selects strategic partners with whom they combine their product or service offerings or collaborate on marketing efforts. The customer receives the integrated value primarily through the keystone (Erevelles *et al.*, 2008). The strategic partners – or niche players – are independent players who generally do not interact with each other. In essence, win-win, business-to-business relationships are established between the keystone and the niche players, where they endorse each other to enhance themselves in the marketplace (Bengtsson and Servais, 2005).

An example is the integration ecosystem developed by South African insurance group, *Discovery®*. They teamed up with more than 50 wellness brands to offer their clients various discounts and special offers, such as discounted gym rates and cash back on healthy food purchases (Swartzberg and Kim, 2016). Discovery effectively integrates the offerings from their partners to differentiate their own product from their competitors'. These alliances enable Discovery to generate new profits, enter new markets, widen their current markets and create barriers to entry from competitors (Rao and Ruekert, 1994; Park, Jun and Shocker, 1996).

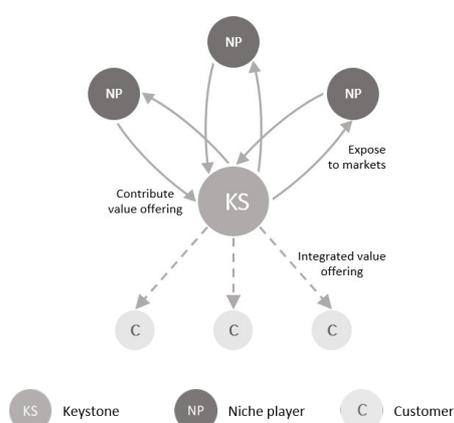


Figure 5: Integration ecosystem partnership structure

Characteristics of the keystone

In the integration ecosystem, the keystone is the vital central organising mechanism. The keystone must have the capability to coordinate numerous, disparate organisations to work together towards a common goal (Eggers and Muoio, 2015). Discovery, who is the keystone of their ecosystem, has the responsibility of strategically coordinating the various niche players, as well as seamlessly integrating the value offerings and delivering it to their end customer (Swartzberg and Kim, 2016).

In most cases, both the keystone and the niche players have relatively well-established brands and their combination provides distinctive advantages (Erevelles *et al.*, 2008). For the keystone however, these partnerships have effects beyond direct advantages. The specific combination of these partnerships have the ability to influence the behaviour of their customers – making them a more ideal customer. The deals that *Discovery* offer to their clients are strategically selected to encourage a healthy lifestyle. And as explained by Swartzberg, Chief Executive Officer of Discovery Partner Markets, “healthier policyholders are less likely to make claims”. This is a concept called *shared value*, which Kim describes the end result as win-win – “the policyholder gets healthier, the premium can go down and the insurance risk decreases” (Swartzberg and Kim, 2016).

Characteristics of the niche players

The niche players in the integration ecosystem are independent players who have existing business infrastructures and value offerings. By establishing a one-to-one relationship with the keystone, they offer their product or service to the customers of the keystone. The value offered by the niche players must be designed as loosely-coupled, externally visible, independent units of functionality to ensure that minimum coordination is required (Leong *et al.*, 2007; Dominic *et al.*, 2011).

Collection ecosystems

Collection ecosystems gather information in the form of contributions, innovations or solutions to problems. Once the contributions come in, the keystone utilises their own internal resources to develop and implement them and effectively, improve the value offered to the customer. This gathered information serves as a supplement for the keystone’s internal R&D efforts (Sahasrabudhe *et al.*, 2012).

Increased choice and accessibility has shifted the power towards the customer, transforming their role in the value creating process from passive recipient to active participant. The role of the producer and consumer is becoming at times almost indistinguishable as the customers are not only enabled, but encouraged to actively partake in the production process (Kelly, 2015a). Businesses are finding new and creative ways to tap into the ideas and solutions from a broad and diverse range of third parties. As a result, people have contributed real value in terms of knowledge, innovation and to the evolution of products (Hagel, 2015; Kelly, 2015a).

The partnering structure in Figure 6 shows how the customer can become the niche player when contributing value to the keystone. It is however, necessary to note that the customer is generally not required to act as niche player in order to receive the value offering from the keystone.

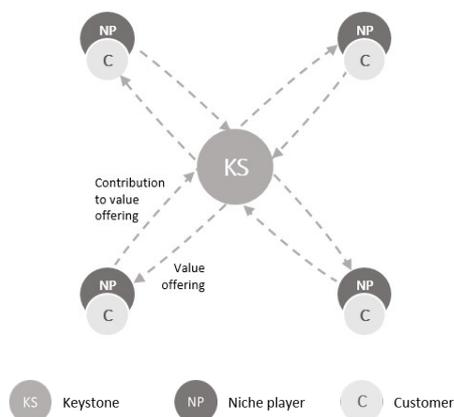


Figure 6: Collection ecosystem partnership structure

Characteristics of the keystone

As in the integration ecosystem, the keystone also plays a central role in the collection ecosystem. By offering a certain reward or providing an incentive, the keystone attracts the contributions of various niche players. These contributions are processed by the keystone and then implemented to improve their value offering to the customer.

The extent to which these contributions are processed by the keystone varies widely amongst ecosystems. Wikipedia® for example, is known as an open-content online encyclopaedia which generates its content through a collaborative effort of its users. Though Wikipedia provides a platform that attracts, facilitates and integrates the contributions of various users, the contributions aren't subject to any further processing, editing or even approval. As a result, Wikipedia is often criticised as not being reliable or authoritative (Rouse, 2016).

On the other end of the spectrum, crowdfunding is a method where the niche players provide inputs in the form of financial contributions. Kickstarter® and GoFundMe® are two examples of platforms that attract various willing contributors. These contributions are used by businesses to develop their corporate activities (Belleflamme, Lambert and Schwienbacher, 2014). Another example is the LEGO® Group, who asks their customers for ideas and suggestions through their LEGO Ideas portal. The submissions are subject to a two-step reviewing process, after which the successful ones become new LEGO products. LEGO rewards the successful contributors by recognising them as a product creator and giving them a royalty on salesⁱ (Kelly, 2015).

As is clear in the LEGO case, the reward that the keystone offers plays a critical role in the collection ecosystem. Platforms such as Kaggle® and Innocentive®

ⁱ <https://ideas.lego.com/howitworks>

allows someone to post a problem or challenge – and offer a payment or other reward to the participant who provides the best solution. Open source software such as Linux® on the other hand, receives on average more than 20000 contributions or modifications per day. These contributors however, do not get reimbursed for their efforts (Daws, 2017). Instead, the reasons why the niche players contribute to open source projects such as Linux vary from gaining experience, improving the product for personal use or even just to give back to the open source community (Lee, 2015). In whichever way the niche player is rewarded for participating and contributing value, it must serve as big enough incentive for them to make the effort.

Characteristics of the niche player/customer

In the collection ecosystem, the niche players are distributed, external entities who contribute value which the keystone implements internally. Some of the greatest ideas will inevitably lie outside the boundaries of any specific business. Somewhere in the mass of suppliers, customers, research organisations or individuals lies a potential solution, improvement, suggestion or innovation (Kelly, 2015). The type of contributions that the niche players offer vary from knowledge contribution, such as Wikipedia, financial contributions to crowdfunding projects and product innovations to open source projects such as Linux.

In exchange for a reward offered by the keystone, the niche player has the opportunity to provide an input for a solution to a specific problem of the keystone.

Matching ecosystems

Matching ecosystems, as the name suggests, connect producers and customers to fulfil a specific purpose. The role of the keystone in the matching ecosystem is to provide a platform where supply of the niche player can be matched to the need of a customer. Different from the integration- and collection ecosystems, the inputs from the niche players are not captured, utilised or processed by the keystone, instead it is directly passed to the customer.

These type of platforms have been around for a long time – shopping malls are platforms that link merchants to customers, and newspapers are platforms that link advertisers to subscribers. What is changing however, is the scale to which these platforms are created through digitalisation. For example, over 5 billion rides have been booked through Uber®, and over 160 million guests have booked accommodation through Airbnb® (Van Alstyne, Parker and Choudary, 2016; Smith, 2017a, 2017b).

Matching ecosystems exist in many varieties and for many different purposes. Nevertheless, they all have the same partnering structure which is displayed in Figure 7. The partnering structure depicts the niche players as the creators of value, and the customers as the buyers or users of the value.

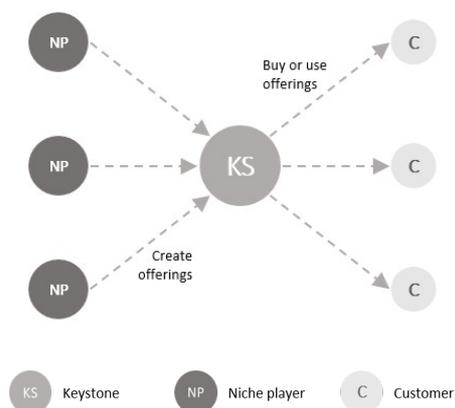


Figure 7: Matching ecosystems partnership structure

Characteristics of the keystone

As displayed in the partnering structure (Figure 7), the keystone plays a central role in the matching ecosystem. The keystone is the provider of the platform that connects the niche players and the customers. An example of a matching ecosystem is Chinese online commerce group, Alibaba®. Alibaba has traded merchandise worth more than 900 billion yuan in a single quarter, without holding any inventory or participating in any logistic, sourcing, storage or shipping processes (Statista, 2016; Pahwa, 2017). TutorVista®, another example of a matching ecosystem, is an online tutoring service that connects students with tutors for virtual tutoring sessions. Once the student has been matched with a tutor, they communicate directly. The communication however, always happens through the TutorVista platform. This platform is specifically created to secure trust between the customer and niche player (Sahasrabudhe *et al.*, 2012).

As explained by several researches, information about past behaviour, goals and reputation are critical factors towards building trust (Barber, 1983; Good, 1988; Buskens, 1998; Seligman, 1998). For this reason, many of these platforms have star-rating systems built into the process for both the niche players and the customers. Uber for example, ask the drivers and the passengers to rate their experience after each ride (Pavia, 2016). Trust, which is ultimately a critical success factor for online commerce, is an assurance to both parties that they will not be cheated, defrauded or receive poor quality goods or service (Head and Hassanein, 2002). Airbnb secures trust between the niche players and customers by holding the payment of a reservation until 24 hours after check-in. This system is to ensure that both the host and the guest is satisfied before the payment is releasedⁱⁱ.

Because the value is exchanged directly between the niche player and the customer, the keystone receives their value through commission or membership fees. Airbnb, for example, takes a 3% commission fee from the host for each reservation (Folger, 2016). Alibaba on the other hand, offers different membership packages to their users to obtain certain advantages. Subsidiary of Alibaba, Taobao®, does not charge any membership or commission fees, instead

ⁱⁱ <https://www.airbnb.com/help/article/92/when-am-i-charged-for-a-reservation>

they give suppliers the option to pay for advertising in order to differentiate them from the other suppliers (Pahwa, 2017).

Characteristics of niche players/customers

As displayed in Figure 7, the niche player has the role of creating the value that is offered on the platform. The customer, at the other end, has the role used or buying the value that is offered. For the most part, customers would prefer to trade directly with niche players in order to cut costs (Haucap and Heimeshoff, 2014). Trading platforms such as Alibaba or Airbnb however, offer both the niche player and the customer convenience, security and variety.

The utilisation of the platform from both the niche player and the customer results in a cycling effect. More potential customers attract more suppliers as the likelihood to sell their product or service increases. And more sellers leads to a larger variety which in turn attract more customers (Haucap and Heimeshoff, 2014).

Data collection ecosystems

Whether a by-product of the ecosystem or the primary purpose thereof, data collection ecosystems collect the data from business activities performed within the ecosystem. The use of data has already transformed traditional industries, but now an entire new industry of analysing and interpreting large amounts of data is being created (Pham, 2015; Lewis and McKone, 2016). The exploitation of the growing amounts of data and computational power enables businesses leaders to make smarter decisions and to take action quickly. Data-driven scenarios and simulations are able to provide immediate guidance and optimal solutions based on complex business parameters (LaValle *et al.*, 2011).

It is no surprise that many businesses value the data that they generate through their normal business operations very highly. It is seen as a way to advance their own business by providing a possible advantage over their competitors. What a lot of businesses have not yet realised, is that this data might be even more valuable to other businesses – businesses that aren't necessarily competitors (Lewis and McKone, 2016). Ecosystems are created with the purpose of collecting mass amounts of data. Google® for example, has attracted the participation of more than 30 trillion, mostly user generated web pages, and more than 1.17 billion users, primarily to collect a wide range of user data (Koetsier, 2013; Richter, 2013). Another example is Discovery, who has successfully established an integration ecosystem – but at the same time they have complete access to real-time data of the health and lifestyle of their clients (Swartzberg and Kim, 2016).

The overwhelming majority of data is created by consumers. Ecosystems are enabling businesses to access and blend multiple sources of data to help them reach even more meaningful conclusions (Johnson, 2017). The partnering structure in Figure 8 displays how the keystone can utilise its niche players to collect and use data. Marketing is one of the most common uses for data, as it is being put to use in increasingly advanced advertising algorithms. Another

common use for data is to improve the value offered to the customer by enabling business leaders to make smarter decisions (O'Neill, 2016).

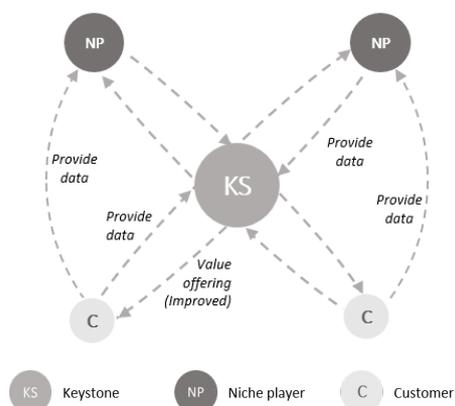


Figure 8: Data collection partnership structure

Characteristics of the keystone

The keystone of a data collection ecosystem requires sophisticated data gathering, storage and analytics capabilities. For example, the success of Discovery's business model is entirely dependent on the scale of data it can gather into a central database from all its different partners. Based on the data that Discovery collects, they are able to dynamically adjust the premiums to their policyholders (Swartzberg and Kim, 2016). In the same way, Google captures data of their user interaction and use it to improve and customise user experienceⁱⁱⁱ.

Google however, is also taking advantage of the fact that their data is valuable to other businesses. In fact, Google primarily generates its revenue through providing relevant, cost-effective online advertising (McFarlane, 2012). Google explicitly states that it does not sell any personal data about its users^{iv}. Instead, they offer a service, AdWords®, in which advertisers submit certain keywords so that their ads will appear in Google's search results.

There are a variety of other ways that businesses use data. American Express® for example, use data on customer behaviour to predict which accounts will have a high probability of closing (O'Neill, 2016). And retailer, Belk®, collects data from each of the corporate groups that serve its 300 stores to generate detailed predictions on what customers will buy (Schultz, 2015). Whatever the use for the data, data collection ecosystems enable the keystone to access multiple new sources of data.

Characteristics of the niche players

In the data collection ecosystems, the niche players capture the data of their customers when buying or using the value that they offer. This data is valuable to the keystone, especially when combined with the data from other niche players. For example, health club Virgin Active® - who is a niche player in

ⁱⁱⁱ <https://privacy.google.com/your-data.html>

^{iv} <https://privacy.google.com/how-ads-work.html>

Discovery's integration ecosystem – captures data about the health activity of the Discovery clients. Discovery is then able to access this data and use it to improve the policies.

Sequenced ecosystems

Most mature businesses operate within sequenced ecosystems. These ecosystems are most commonly represented by what is known today as traditional supply chains. The partnering structure for a sequenced ecosystem is displayed in Figure 9. The keystone in this ecosystem specifies a high level of detail for the activities that they require. This set of activities is tightly managed and should be completed in a sequential manner (Sahasrabudhe *et al.*, 2012).

Businesses such as General Motors® has accomplished to manage complex supply chains due to their mature supply chain management capabilities. Lean thinking, which was pioneered by Toyota®, is one of the most dominant paradigms in writing about supply chain management. Lean aims to reduce uncertainty as much as practicable in order to facilitate a more predictable upstream demand and level schedule (Cox, 1999; Mason-Jones, Naylor and Towill, 2000).

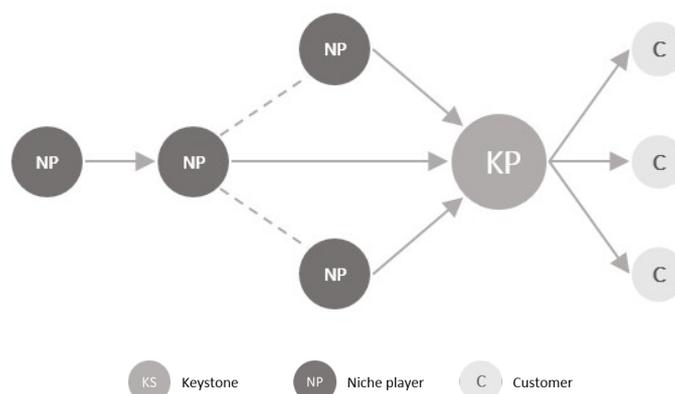


Figure 9: Sequenced ecosystem partnering structure

The characteristics of the keystone

In the sequenced ecosystem, the keystone plays a central role of continuously coordinating the activities that happen within the ecosystem (Sahasrabudhe *et al.*, 2012). The scope of these ecosystems has extended across national boundaries. Global businesses such as Coca-Cola® have created individual ecosystems within the local areas where they operate. They utilise local suppliers and bottlers and employ local people, creating a supply chain similar to any other local manufacturer. In the same way, Toyota® conducts its business worldwide with 53 manufacturing companies in 28 countries or regions^v. By operating on local scale, global businesses are able to focus their products and practices to local cultures and regulations (Lupo, 2013).

^v <http://newsroom.toyota.co.jp/en/corporate/companyinformation/worldwide>

Though the operations are executed locally, it does not necessarily include local small businesses. The Coca-Cola South African Bottling Company® (Sabco) for example, has 18 manufacturing plants in Africa and employs more than 9000 people^{vi}. An example of a business that has included small businesses in their supply chain, is South African retailer Woolworths®. Woolworths strives to contribute towards social transformation. They provide business development support and financial assistance to 44 SMEs whom they have included into their supply chain (WHL, 2016). SABMiller® who shares this ambition, also has a commitment to accelerate growth and development in their supply chains by directly supporting more than half a million SMEs to enhance their growth (Jenkins, 2015).

Characteristics of the niche players

The niche players in a sequenced ecosystem create value which they supply to other players in the sequenced ecosystem. They typically interact with additional upstream or downstream participants, as seen in Figure 9. The niche players consist of the manufacturers, suppliers and service providers that the keystone require to complete their value offering. For example, some of the major suppliers for General Motors include NGK Spark Plug Co® and Mitsubishi Electric®. These companies manufacture standard components of which the requirements are pre-specified by General Motors (Maverick, 2015).

THE ROLE OF SMES

SMEs are recognised by their small size and they are generally classified by number of employees, total turnover and total asset value. This definition of SMEs encompasses a very broad range of firms, including formally registered, informal and non-VAT registered firms (DTI, 2008). In South Africa however, the large majority of SMEs (66,52%)^{vii} operate in the informal sector (SEDA, 2016). Surveys conducted by Krause and Schutte (2015)^{viii} and Cant and Wiid (2013)^{ix} confirmed that most South African SMEs are owner managed. Though the majority of SME owners have some level of education, there is a severe lack of secondary education amongst informal SME owners (SEDA, 2016).

Lack of education and lack of managerial competency are extreme barriers for SMEs as it hinder their ability to effectively source, manage and allocate finance. Finance, in return, enables SMEs to hire high quality employees, purchase required equipment and technologies and have sufficient cash flows. As a result, SMEs often suffer from resource constraints and have difficulties engendering growth (Fatoki and Odeyemi, 2010; Chimucheka, 2013).

When determining the role that SMEs will be able to play in ecosystems, it is necessary to consider their characteristics and competencies. Figure 10 provides

^{vi} <http://www.cocacolasabco.com/>

^{vii} An estimation is based on the Quarterly Financial Labour Survey (QFLS) published by StatSA (www.statssa.gov.za).

^{viii} 531 people were reached through various SME business groups on the professional online platform LinkedIn (www.linkedin.com) with qualified response rate of 15,9%.

^{ix} A survey done on 81 respondents in the Tshwane area.

a summary of the characteristics of the members within each type of ecosystem. As seen in this figure, the keystone mostly requires complex and sophisticated capabilities. Based on the competency level of SMEs it is quite evident that they will generally not be suited for the role of the keystone. The role of the niche player however, presents numerous opportunities for SMEs.

	PURPOSE	KEYSTONE		NICHE PLAYER		CUSTOMER	EXAMPLE
INTEGRATION ECOSYSTEM	Several businesses integrate their offerings to provide a more attractive offering to the downstream customer	Value Offered	Exposure to markets; Strategic benefits	Value Offered	Special offers on product or services	Receive value from keystone	<i>Discovery</i>
		Value Received	Competitive advantage; Customer behaviour	Value Received	Exposure to markets; Strategic benefits		
		Required Capability	Coordinate and integrate value offerings	Required Capability	Independent units of functionality		
COLLECTION ECOSYSTEM	Gather or distribute information in the form of contributions, innovations or solutions to problems	Value Offered	Incentive or reward	Value Offered	Idea, innovation, solutions or finance	Receive value from keystone Can act as niche player	<i>Wikipedia</i> <i>Kickstarter</i> <i>GoFundMe</i> <i>LEGO</i> <i>Kaggle</i> <i>Innocentive</i> <i>Linux</i>
		Value Received	External value contribution	Value Received	Incentive or reward		
		Required Capability	Attract niche players; Process contributions	Required Capability	Solution to specified problem		
MATCHING ECOSYSTEM	Connect suppliers with customers to fulfil a specific purpose.	Value Offered	Access to buyers/sellers Trust relationship	Value Offered	Value offerings such as products or services	Receive value from niche player	<i>Uber</i> <i>Airbnb</i> <i>TutorVista</i> <i>Alibaba</i> <i>Taobao</i>
		Value Received	Commission; Membership fee	Value Received	Convenience, security and variety		
		Required Capability	Platform for exchange	Required Capability	Comply to rules of platform		
DATA COLLECTION ECOSYSTEM	Collect and use the data from the business activities performed within the ecosystem	Value Offered	Platform for exchange	Value Offered	Data of business activities	Receive value from keystone	<i>Google</i> <i>Discovery</i> <i>AdWords</i> <i>American Express</i> <i>Belk</i>
		Value Received	Decision making; Marketing	Value Received	Decision making Marketing		
		Required Capability	Data gathering, storage, analytics	Required Capability	Capture and share data		
SEQUENCED ECOSYSTEM	A series of activities are performed in a sequential manner	Value Offered	Local employment Business support	Value Offered	Local business activities	Receive value from keystone	<i>General Motors</i> <i>SABMiller</i> <i>Woolworths</i> <i>Coco-Cola</i> <i>Sabco</i> <i>Toyota</i>
		Value Received	Local employment Business support	Value Received	Employment Business support		
		Required Capability	Complex SC management	Required Capability	Product/services as specified by keystone		

Figure 10: Summary of ecosystem roles

The narrow focus and deep specialisation that SMEs often inherits, makes them attractive to keystone businesses for several reasons. By connecting with a wide range of SMEs, the keystone can access a broad spectrum of products and services that normally fall outside of their capacity or capability. As seen in the integration and matching ecosystems, the keystone can integrate these offerings with their own or offer it directly to their customer. Furthermore, the keystone can access expanded sources of external knowledge and expertise that can be used to supplement their internal R&D processes.

For SMEs, these relationships offer value that can reduce the barriers and challenges that they typically face. SMEs will be exposed to larger and more stable markets, where the keystone might even encourage their customers to use these products or services – as seen in the Discovery case. They keystone can provide infrastructure to the SMEs where they can securely and conveniently interact and transact with a larger amount of customers.

The benefits of exploiting local sources have already been realised by global businesses such as Coca-Cola and Toyota. However, including local SMEs into their supply chain would only result in an even more complex supply chain. Businesses that have incorporated SMEs into their supply chain have done primarily so to contribute to social transformation. Social responsibility is becoming an increasingly important factor for businesses as it is becoming increasingly important to their customers.

SME required capabilities

For the most part, as displayed in Figure 10, the niche player must be capable of conforming to the rules and the standards defined in the ecosystem infrastructure in order to successfully participate. In most ecosystems the keystone provides a platform to attract the participation of a large number of niche players. The development and operation of the platform requires extensive organisational capabilities from the keystone in the form of strategic considerations, technological capabilities and measuring practices (Mehrotra, 2017). A critical aspect of the platform however, is to consider the needs and requirements of the niche players using the platform. For the keystone to successfully interact with SMEs, the platform must be designed specifically around the capabilities and the limitations of SMEs.

For SMEs to be able to contribute value to the ecosystem, they require several additional internal capabilities. Firstly, their area of expertise and available services/products must correspond with the needs of the keystone and downstream customer. Secondly, their offerings must be designed as loosely-coupled, externally visible, independent units of functionality. And thirdly, SMEs must have the ability to capture, store and share the data that is generated within their business activities.

Numerous other capabilities were identified through the course of this paper that would greatly enhance SME performance in ecosystems. The first capability is to make the end customer active participant in their internal value creation process. And the second is to acquire some sort of data analysis capability.

CONCLUSION AND RECOMMENDATIONS

By categorising the different types of ecosystems according to their value creation process, the symbiotic nature of the relationships between the keystone and niche players is highlighted. For each ecosystem, the value that is created by and for each member is identified (see Figure 10). This value serves as a

validation for the interest in these relationships, as well as the need to support them.

The case studies explored in this study represents businesses that operate mostly in niche markets. Nonetheless, important mechanisms of the business relationships have been identified that still remain relevant if the same concept is to be translated to developing countries. While the results of this study does not provide solutions that should be transferred directly to ecosystems in developing countries, the conclusions that have been drawn serve as important focus areas for future research.

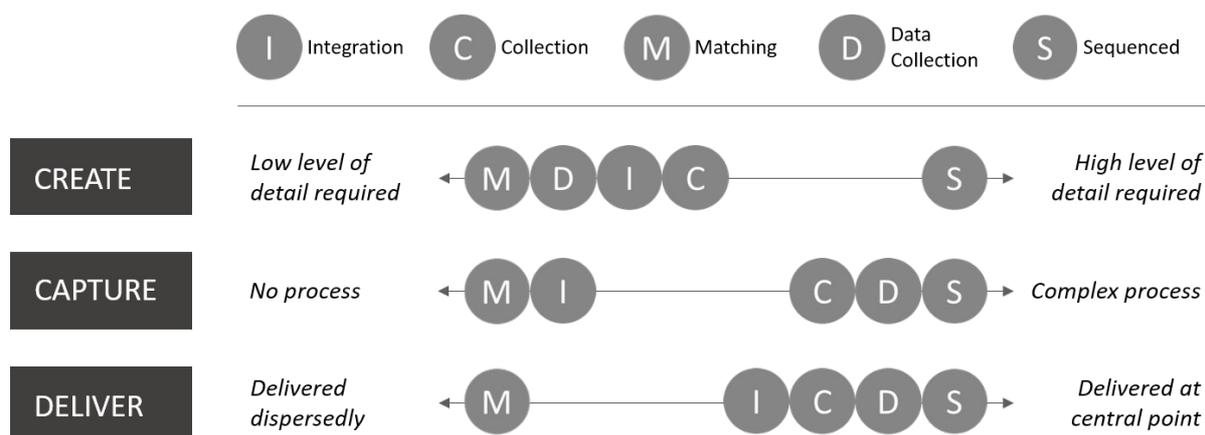


Figure 11: Categorisation of ecosystems

The first conclusion is that there are various ways in which SMEs contribute value to ecosystems. As summarised in Figure 11, there are five different categories of ecosystems, each with a unique value creating process. The value creating process is an important consideration as it influences the way an ecosystem acts.

The second conclusion is that, regardless of the value creating process, SMEs will have to fulfil certain requirements in order to participate in the ecosystem. The keystone often has a substantial amount of influence in the type of platform that SMEs have to interact with. This study highlighted the importance for the keystone to consider the specific characteristics of SMEs when managing value creating relationships with them.

The last conclusion is that the performance of ecosystems depend on the flow of value between entities. This emphasises the relationships and channels between two value creating partners. Businesses must be equipped to offer and receive value in a manner that is compatible with their value exchanging partners. SMEs are mostly required to adapt to the processes of their larger partners, often placing even more stress on their already limited resources.

Future research will benefit from studying these considerations in the context of developing countries.

APPENDIX A

Case study	Website	Categorisation
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AdWords	adwords.google.com/home/	Data collection ecosystem
Airbnb	www.airbnb.com	Matching ecosystem
Alibaba	www.alibaba.com	Matching ecosystem
American Express	www.americanexpress.com	Data collection ecosystem
Belk	www.belk.com	Data collection ecosystem
Coco-Cola	www.coca-cola.com/global/	Sequenced ecosystem
Discovery	www.discovery.co.za/portal/	Integration ecosystem
General Motors	www.gm.com	Data collection ecosystem
GoFundMe	www.gofundme.com	Collection ecosystem
Google	www.google.com	Data collection ecosystem
Innocentive	www.innocentive.com	Collection ecosystem
Kaggle	www.kaggle.com	Collection ecosystem
Kickstarter	www.kickstarter.com	Collection ecosystem
LEGO	ideas.lego.com/dashboard	Collection ecosystem
Linux	www.linux.org	Collection ecosystem
Mitsubishi Electric	www.mitsubishielectric.com	Sequenced ecosystem
NGK Spark Plug Co.	www.ngksparkplug.com	Sequenced ecosystem
Sabco	www.cocacolasabco.com	Sequenced ecosystem
SABMiller	www.sab.co.za/	Sequenced ecosystem
Taobao	world.taobao.com	Matching ecosystem
Toyota	www.toyota-global.com/	Sequenced ecosystem
TutorVista	www.tutorvista.com	Matching ecosystem
Uber	www.uber.com	Matching ecosystem
Wikipedia	en.wikipedia.org/wiki/Main_Page	Collection ecosystem
Virgin Active	www.virginactive.com	Sequenced ecosystem
Woolworths	www.woolworths.co.za/	Sequenced ecosystem

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