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# COOPERATION OR COMPETITION: A STUDY OF SOCIAL CAPITAL AND PRODUCTION DECISION UNDER POTENTIAL VERTICAL COMPETITION

**Naixin Guo**

**Thesis Submitted to Durham University for the Degree of Doctor of Philosophy**

**July 2019**

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Naixin Guo

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To my parents, supervisor, and friends, for your support, guidance, and encouragement.

# ABSTRACT

Since the 2000s when retailers recognised the huge market potential, the growth of private labels has been unstoppable worldwide. As a result of the recession of national brands, manufacturers are in a relatively weaker position when dealing with large retailers. The relationship between manufacturers and retailers has transformed from pure cooperation to a delicate balance of cooperation and competition. Yet, how such a balance influences supply chain dynamics is an intriguing and overdue issue. This thesis explores the influence of social capital over manufacturers' perceptions regarding their retailers' trustworthiness in the presence of potential vertical competition, as well as the consequential performance from the perspective of cognitive abilities. Data was collected through an online scenario-based role play (SBRP) experiment, where 371 participants were recruited and put in three groups. In each group, participants were provided with a scenario depicting the product substitution level between a newly launched private label and a national brand. The data was analysed statistically to test the hypotheses. The results identify relational capital as the most influential dimension of social capital in suppressing manufacturer's perception of opportunistic information sharing behaviour from retailers, and suggest that such suppression is moderated by the level of product substitution between private labels and national brands. This thesis has reference value to academia by looking into the overlapping issues of supply chain management and marketing and providing empirical evidence of the influences induced by the introduction of private labels. It also benefits industry, especially manufacturers, by giving a brief standard regarding whether to cooperate or compete when faced with potential vertical competition with retailers.

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# CHAPTER 1 INTRODUCTION

## 1.1 Introduction

This is the introductory chapter of the thesis. It presents the background information, the context within with the research is conducted, and the objectives of this study. It also briefly introduces the methodological approach used to investigate the research problem before outlining the potential of this thesis for both theoreticians and for practitioners. The final section of this chapter presents an overview of the structure of this thesis.

## 1.2 Problem statement

### 1.2.1 Background and motives

The past decade has witnessed the prosperity of private label products. Leading retailers are gradually paying more attention and investment in their store brands. For example, Carrefour has launched more than 2000 store brands, while Sainsbury's had developed 3500 store brands by 2010. Asda secured its leading role in retailing by investing and promoting the Chosen By You series (Simpson, 2013). Furthermore, America experienced private label expansion and national brand recession in 29 out of the top 30 product categories from 2006 to 2010 (Gruver, 2011). In Europe, 23% of European market share has been taken by private labels, and the percentage is even higher in the United Kingdom, Germany and Spain (Cuneo et al., 2015). Jim Lawrence, chief financial officer of Unilever, describes the retail market as "clearly challenging" due to its shrinking market share in Europe, its biggest regional market. Consumers in Europe are turning to retailers' private label products as cheaper options (Wiggins, 2008). With regard to private label expansion, John Duffy, chief executive of Finsbury Foods, which supplies cake for Asda and Waitrose, expresses concern for being in a weaker position by not feeling "very powerful" (Lucas and Felsted, 2012). Thus, how such competition changes the interactions and relationships between manufacturers

and buyers is an intriguing question that has yet to be explored.

There has been growing interest in how supply chain relationships improve performance during the last decade as scholars have realised the limitations of one-dimensional operationalisation of the supply chain relationship. Son et al. (2016) acknowledge the growing application of social capital theory in supply chain management studies (Carey et al., 2011, Villena et al., 2011, Krause et al., 2007), and highlight its theorisation of the nature of connection and cooperation between organisations. Social capital theory is based on the expected returns from investment in social relations (Lin, 1999). These returns refer to the resources that are only available in relationships and are expected to enhance performance eventually. Villena et al. (2011) summarise that accumulating social capital can make resources that reside in relationships available to supply chain participants while simultaneously soothing conflicts and encouraging cooperative behaviour through the presence of a shared vision, trusting relationships and social ties.

Given the sufficiency in studies highlighting how positive relationships enhance performance, surprisingly few studies have explained the rationale behind this phenomenon. The process through which performance is boosted by relationships, however, remains ambiguous. It seems even more confusing when the negative results of social capital are taken into consideration. Villena et al. (2011) refer to undesirable consequences and risks embedded in social capital as the “dark side” of social capital, which is likely to cause opportunistic behaviour. For example, trust developed from repeated transactions inspires open communication and behavioural transparency, making decision makers less concerned about the self-interested behaviours of other parties (Blau, 1964, Jarillo, 1988, Villena et al., 2011). A lack of vigilance provides an opportunity for unethical acts, especially when interest conflicts and competition are involved. The awareness of such possibilities is enhanced by the prevalence of private labels, which poses a threat to the development of manufacturers’ national brands and transforms the pure collaborative relationships

into a complicated balance of cooperation and competition. This demonstrates conflicting interests and incongruity in business vision and objectives. Under such circumstances, trusting business partners are also potential competitors. Given the sufficiency in literature arguing that social capital (including common goals, trust, etc.) enhances cooperation, we understand neither how to balance between cooperation and competition, nor the consequences of the imbalance. Furthermore, since the perception is conceptualised at an individual level it is necessary to take individual differences into consideration, which can explain some variances in the research outcome (Moritz et al., 2013). Thus, drawing from cognitive theories applied in decision making and judgement, this thesis examines the moderating role of cognitive reflection with regard to the relationship between individual perception and performance.

### 1.2.2 Research question

This research aims to explore manufacturers' perceptions of retailers' trustworthiness during vertical competition and the role of cognitive reflection in organisational performance. To achieve this objective, the following question has emerged:

How does social capital influence production decisions under potential vertical competition?

To answer this question, this thesis presents a conceptual model with hypotheses developed with regard to previous studies. This model covers the relationship between two business partners and the way this relationship influences decision makers' judgement. It also outlines the possible consequences under different circumstances, hoping to provide insights for both theoreticians and for practitioners who face similar problems.

## 1.3 Thesis outline

The way in which the research gap and research problem have been identified and

explored is summarised in the thesis outline. In this chapter, Chapter One, the discussion includes the research background of the research question, the purpose, and the major contributions of this study.

Chapter Two provides the theoretical background that has been used to investigate social capital and its influences over perceptional trustworthiness under different levels of product substitution. Key concepts that have been discussed and reviewed include social capital theory, private labels, biases in the newsvendor model, and cognitive reflection. Studies covering the historical origin, conceptualisation, application in modern supply chain management will be included. Discussion about private labels includes the factors of their success, the way in which they change the interactions with manufacturers and consumers, and, most importantly, the competition between the upstream national brand manufacturers and the retailers who have developed their own store brands. Regarding the newsvendor model, the next chapter primarily focuses on the biases that have been observed in previous studies, with an emphasis on those caused by individual cognitive abilities. The discussion of these theories supports the establishment of a conceptual model in Chapter Three.

Chapter Four describes the research paradigm and research approach that have been adopted in this study to empirically investigate the research question. This chapter details the design of an SBRP experiment, along with the introduction of the techniques used to design the vignette and the measuring instruments employed to locate the sample and collect data.

Chapter Five presents the results of data analysis, as well as a brief interpretation of these results. This chapter begins with a descriptive analysis of the subjects and a preliminary correlation analysis of the key variables; subsequently, it describes the statistical methods of testing the conceptual model and the predetermined hypotheses. Chapter Six provides a discussion of the major findings of this study with regard to previous research. This chapter includes explanations for both support and

rejection of the hypotheses. In the end, this chapter ends this thesis by highlighting the contributions, managerial implications, and limitations of this study before outlining suggestions for future research.

# CHAPTER 2 LITERATURE REVIEW

## 2.1 Introduction

This chapter presents a review of the key concepts involved in this study. These concepts range from social capital's influences over retailers' trustworthiness under different levels of product substitution between private labels and national brands to the influences of retailers' trustworthiness on the manufacturer's performance in terms of inventory management. Barney and Hansen (1994) differentiate trustworthiness from trust, with the former being an attribute of individual exchange partners and the latter being an attribute of a relationship between exchange partners. Trustworthiness is the quality of an exchange party that "will not exploit other's exchange vulnerabilities" (Barney and Hansen, 1994). Moreover, trustworthiness is a perception of integrity because a firm that is considered as trustworthy is perceived to not perform any opportunistic actions. Opportunism can sometimes be realised through information sharing, one of the major outcomes of social capital, as well as a major channel of communication in a supply chain. Most importantly, information is a resource that is subject to manipulation for one party's benefit; thus, it is necessary to review trustworthiness/untrustworthiness empowered by social capital with a focus on information sharing. Driven by the perceptional trustworthiness of the retailer, the manufacturer makes production decisions, based on which performance is measured. Given the heuristics and heterogeneity in human decision making, considerations of cognitive abilities should be included.

Based on the key elements included in the research context, this chapter is arranged as follows. Sections 2.2 - 2.5 introduce and discuss social capital theory, from its historical development to modern applications in supply chain management within the boundaries of this study. Section 2.4 introduces both the bright and dark sides of social capital; this will facilitate a discussion of trustworthiness and opportunism,

which are mainly related to information sharing entangled in this concept and the mitigating mechanisms in Section 2.5. In this study, the introduction of private labels works as a trigger to a manufacturer's perception of his/her retailer's trustworthiness. Section 2.6 provides a review of the extant literature on private labels with a focus on the shock on traditional manufacturers, the main battlefield of private labels and national brands, as well as the changes they have imposed on the dynamics between manufacturers and retailers. Since we aim to examine subjects' performance based on their inventory decisions, Section 2.7 provides a discussion on the newsvendor model, with a focus on the inherent heuristics and biases in human decision making in this model, as well as heterogeneity in cognitive reflection. Deriving from a review on the relevant literature, Chapter Two allows the development of a conceptual framework in the next chapter.

## 2.2 Social capital theory

### 2.2.1 What is social capital?

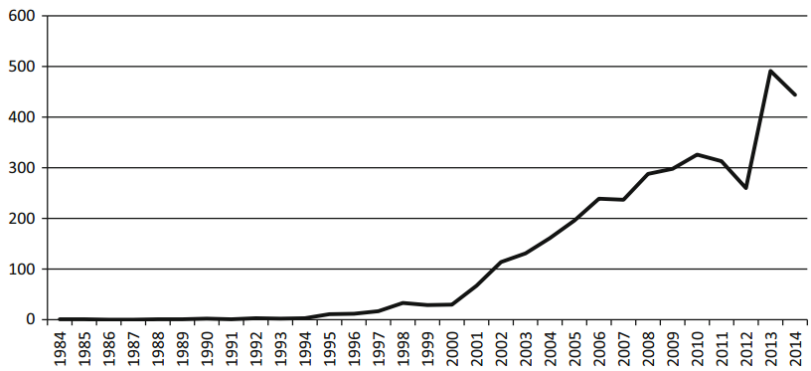


**Figure 2. 1** Social capital articles by year, taken from Engbers et al. (2017)

Social capital depicts relationships/social networks as a valuable resource that empowers social action (Jacobs, 1961, Burt, 1992, Nahapiet and Ghoshal, 1998). The use of this concept can be dated back to the 19th century, reaching its current form in the first half of the 20th century (Grootaert and Van Bastelar, 2002), and booming after the publication of Robert Putnam's Bowling Along in 2000 (Engbers et al., 2017). Since 2000, the citation of social capital in academic papers has been growing almost

exponentially (see Figure 2.1, taken from Engbers et al., 2017).

The widely acknowledged first use of the term "social capital" in its contemporary sense appears in Lyda J. Hanifan's analysis of community in rural districts (Farr, 2004, Field, 2008, Conrad, 2008). Hanifan (1916) first referred to social capital as "goodwill, fellowship, mutual sympathy and social intercourse among a group of individuals and families" (Farr, 2004). Following this study, Hanifan (1920) further established and strengthened the association between social capital and "the community centre idea" in his final and most important piece of work (Farr, 2004). A similar idea is proposed by Serageldin and Grootaert (1998), who advocate that a "glue that holds societies together" (Serageldin, 1996) is necessary to maintain a functioning social order, accompanied by a certain degree of common cultural identifications, a sense of "belonging", and shared behavioural norms. This association is the rudiment of the congruity of values, which is considered to be a critical dimension of social capital in the more recent development of this concept. There was moderate extension and enrichment of this concept until the mid-90s, when the published work of Putnam (1995) significantly enhanced its use (Farr, 2004).

Major contemporary researchers on the development of social capital include Bourdieu, Coleman, and Putnam (Lang and Hornburg, 1998, Portes, 1998, Carroll and Stanfield, 2003, Field, 2008), which will be discussed in the later sections. Portes (1998) has summarised a number of theoretical analyses of social capital, including Baker (1990), Schiff (1992), and Burt (1992), while Baker (1990) defines the concept as "a resource that actors derive from specific social structures and then use to pursue their interests; it is created by changes in the relationship among actors". The term is defined in a broader sense by Schiff (1992) as "the set of elements of the social structure that affects relations among people and are inputs or arguments of the production and/or utility function". Burt (1992) defines it as "friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital". In spite of the emphasis on different perspectives, there is a

consensus on the core idea of social capital that social capital depicts the ability of actors to secure benefits by virtue of membership in social networks or other social structures (Portes, 1998). The abovementioned benefits are specified by Nahapiet and Ghoshal (1998) as "the collectively-owned capital, a 'credential' which entitles them to credit, in the various sense of the word" (Bourdieu, 1986).

The acceptance of this concept is evident in many disciplines where relationships are crucially important, such as economics, sociology, political science and others (Engbers et al., 2017). However, there has been no universal consensus on the definition of social capital. Serageldin and Grootaert (1998) illustrate the variety of definitions by drawing the applications of this concept from multiple fields. In political science, sociology, and anthropology, social capital is usually depicted as the set of norms, networks, and organisations that facilitate people with power and resources, which are contributory to decision making and policy formulation (Serageldin and Grootaert, 1998). In contrast, researchers tend to attach economic growth, market functioning, and macro-economic performance when they develop a definition of social capital tailored to their research context (Serageldin and Grootaert, 1998). The lack of an established narrow definition results from two major causes. Firstly, the emphasis on different perspectives of social capital generates a number of definitions that embody their own particular focuses (Adler and Kwon, 2002); focuses on substance, source, effects of social capital, and relationship structures all lead to varying definition versions with significant nuances (Adler and Kwon, 2002). Secondly, for a concept that is widely accepted in multiple disciplines, a precise definition is usually not critical for carrying out a valid exploration. Given its multidisciplinary appeal, the lack of consensus on a precise definition of social capital results in the variation in the interpretations of this concept (Grootaert and Van Bastelar, 2002). Despite the heterogeneity in the narrow, precise, field-wide definition of social capital, researchers have presented solid and replicable research outcomes by carefully picturing this concept and adjusting methodologies accordingly (Grootaert and Van Bastelar, 2002).

### 2.2.2 Forms of social capital

Social capital has been defined with varying focuses, resulting in a significant number of definitions. Despite the differences and focuses, Conrad (2008) has established that the core principle of social capital is that it benefits those who have access to it (Burt, 2000) by generating a variety of advantages, ranging from better prospects in job hunting (Granovetter, 1973) and reduced risk of depression (Kaplan et al., 1987) to more mundane things that support our everyday lives. Some popular methods of defining and distinguishing social capital are discussed below.

The bridging and bonding views on social capital are proposed by Putnam (2000) and remain one of the most frequently referenced approaches to categorise the explorations of social capital. These approaches provide two critical aspects of the elements of a social structure (Chiu et al., 2008). The difference between bridging and bonding social capital lies in the types of socialising they focus on (Coffé and Geys, 2007), and the functions they serve (Leonard, 2004). Putnam cites Xavier de Souza Briggs' (1998) assertion that bonding social capital is "getting by", and bridging social capital is "getting ahead" (Conrad, 2008). The bridging view mainly examines the foregrounds of external relations (Adler and Kwon, 2002). Putnam (2000) defines bridging social capital as the resources located in the external links developed and established across diverse social groups (Beugelsdijk and Smulders, 2003, Adler and Kwon, 2002); it involves crosscutting or overlapping networks (Coffé and Geys, 2007), meaning the direct and indirect links connecting individuals and organisations to support their actions (Adler and Kwon, 2002). In contrast, the bonding view of social capital examines the collective actors' internal characteristics (Adler and Kwon, 2002). It only occurs among homogeneous populations (Beugelsdijk and Smulders, 2003), lying in the collective linkages among actors and supporting the pursuit of collective goals (Adler and Kwon, 2002). The bridging and bonding views of social capital do not stand completely independently like "either-or categories"; rather, they serve as "dimensions along which we can compare different forms of social capital" (Putnam, 2000). Besides definitions stemming from the bridging and bonding views, Adler and

Kwon (2002) established a group of definitions that are neutral on the internal/external dimensions based on the two considerations. First, the categorisation of external and internal linkages is a matter of perspective and unit of analysis. Second, the behaviour of a network actor is usually the outcome of both external and internal linkages. Table 2.1 contains definitions from the three dimensions (external, internal and neutral) of social capital, taken and adapted from Adler and Kwon (2002).

| External Versus Internal | Authors | Definitions of Social Capital |
|---|---|---|
| **External** | Baker | 'a resource that actors derive from specific social structures and then use to pursue their interests; it is created by changes in the relationship among actors'; (Baker, 1990, p. 619) |
| | Belliveau, O'Reilly, Wade | 'an individual's personal network and elite institutional affiliations' (Belliveau et al., 1996, p. 1572). |
| | Bourdieu | 'the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition' (Bourdieu, 1986, p. 248). 'made up of social obligations ('connections'), which is convertible, in certain conditions, into economic capital and may be institutionalized in the form of a title of nobility' (Bourdieu, 1986, p. 243). |
| | Bourdieu and Wacquant | 'the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition' (Bourdieu and Wacquant, 1992, p. 119). |
| | Boxman, De Graai, and Flap | 'the number of people who can be expected to provide support and the resources those people have at their disposal' (Boxman et al., 1991, p. 52). |
| | Burt | 'friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital' (Burt, 1992, p. 9). 'the brokerage opportunities in a network' (Burt, 1997, p. 355). |
| | Knoke | 'the process by which social actors create and mobilize their network connections within and between organizations to gain access to other social actors' resources' (Knoke, 1999, p. 18). |

| | | |
|---|---|---|
| | Portes | 'the ability of actors to secure benefits by virtue of membership in social networks or other social structures' (Portes, 1998, p. 6). |
| **Internal** | Brehm and Rahn | 'the web of cooperative relationships between citizens that facilitate resolution of collective action problems' (Brehm and Rahn, 1997, p. 999). |
| | Coleman | 'Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure' (Coleman, 1990, p. 302). |
| | Fukuyama | 'the ability of people to work together for common purposes in groups and organizations' (Fukuyama, 1995, p. 10). 'Social capital can be defined simply as the existence of a certain set of informal values or norms shared among members of a group that permits cooperation among them' (Fukuyama, 1997). |
| | Inglehart | 'a culture of trust and tolerance, in which extensive networks of voluntary associations emerge' (Inglehart, 1997, p. 188). |
| | Portes and Sensenbrenner | 'those expectations for action within a collectivity that affect the economic goals and goal seeking behavior of its members, even if these expectations are not oriented toward the economic sphere' (Portes and Sensenbrenner, 1993, p. 1323). |
| | Putnam | 'features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit' (Putnam, 1995, p. 67). |
| | Thomas | 'those voluntary means and processes developed within civil society which promote development for the collective whole' (Thomas, 1996, p. 11). |
| **Both types** | Loury | 'naturally occurring social relationships among persons which promote or assist the acquisition of skills and traits valued in the marketplace. . . an asset which may be as significant as financial bequests in accounting for the maintenance of inequality in our society' (Loury, 1992, p. 100). |
| | Nahapiet and Ghoshal | 'the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network' (Nahapiet and Ghoshal, 1998, p. 243). |
| | Pennar | 'the web of social relationships that influences individual behavior and thereby affects economic growth' (Pennar, 1997, p. 154). |

| | |
|---|---|
| Schiff | 'the set of elements of the social structure that affects relations among people and are inputs or arguments of the production and/or utility function' (Schiff, 1992, p. 160). |
| Woolcock | 'the information, trust, and norms of reciprocity inhering in one's social networks' (Woolcock, 1998, p. 153). |

**Table 2. 1** Definitions of social capital

Social capital can also be viewed from horizontal/vertical dimensions. Serageldin and Grootaert (1998) take a progressive approach to investigate the definitions of social capital. They identify Putnam's definition as the most famous and most narrowly defined version (Putnam, 1993, Putnam et al., 1993); it regards social capital as "horizontal associations", including "networks of civic engagement" and social norms, among the individuals that are influential over the community's productivity. In this definition, social capital empowers the members of an association to reach mutual benefits through coordination and cooperation (Putnam, 1993). Serageldin and Grootaert (1998) refer to Coleman's (1988) as the second view of social capital, which complements the horizontal view by encompassing vertical associations and the behaviour of other entities. Coleman (1988) defines social capital as "a variety of different entities, with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors – whether personal or corporate actors – within the structure". To further broaden the scope of this concept, Serageldin and Grootaert (1998) identify a third, more inclusive view of social capital which includes the social and political environment that allows the development and shaping of a formal social structure through norms. In summary, the horizontal view predominantly examines informal and local horizontal networks. Based on this view, the second view introduces hierarchical associations into this concept. Integrated with the previous two views, the third adds formalised national structures (Serageldin and Grootaert, 1998).

Alternatively, Inkpen and Tsang (2005) define social capital as "the aggregate of resources embedded within, available through, and derived from the network of

relationships possessed by an individual or organization". This definition distinguishes individual/private social capital from organisational/public/aggregate social capital. Networks of relationships are depicted as valued resources for both individuals and organisations. Individual social capital stems from an individual's networks, where individuals receive a range of benefits, including information exchange and contract enforcement, from knowing others in the same network and focusing on a shared vision and collective goals (Nahapiet and Ghoshal, 1998). On the contrary, organisational social capital originates from an organisation's network of relationships (Inkpen and Tsang, 2005); it can affect the level of democracy and economic growth within a nation or region and the effectiveness of local government through civic engagement and civic networks (Beugelsdijk and Smulders, 2003). However, these two perspectives do not stand exclusively as sometimes one is generated based on the other (Inkpen and Tsang, 2005).

Another broadly accepted fundamental, most useful way of distinguishing different forms of social capital is through structural and cognitive phenomena (Uphoff, 2000). Structural social capital is usually extrinsic, externalised and observable. It includes a variety of social networks, organisations, roles, rules, precedents, and procedures that are supporting activities to achieve mutually beneficial collective actions. On the other hand, cognitive social capital is usually intangible. It consists of norms, values, attitudes, and beliefs that facilitate cooperative behaviour to reach mutually beneficial collective actions (Uphoff, 2000). Structural and cognitive social capital are inherently associated and reinforce one another (Uphoff, 2000, Grootaert and Van Bastelar, 2002). One can exist but cannot persist without the other (Uphoff, 2000).

Based on the scope of social capital, Grootaert and Van Bastelar (2002) propose that the concept should be viewed via micro, meso and macro levels of observation units. Following Serageldin and Grootaert (1998), the authors identify the micro level as horizontal social capital and the meso level as an integrated network of both horizontal and vertical relationships. Social capital at the micro level involves

horizontal networks of individuals and households alongside the shared norms and community values supporting these networks (Putnam et al., 1993, Grootaert and Van Bastelar, 2002). The meso level examines both vertical and horizontal relations. Social capital at the macro level has been mainly proposed by Olson (1982) and North (1990). It involves governance arrangements as well as the institutional and political environment in which economic and social activities are conducted (Grootaert and Van Bastelar, 2002). Grootaert and Van Bastelar (2002) present the extensiveness of the conceptualisation of social capital in a matrix (see Figure 2.2). This approach echoes and overlaps the classification of social capital proposed by Woolcock and Narayan (2000), who use communitarian, network, institutional and synergy perspectives to define social capital.

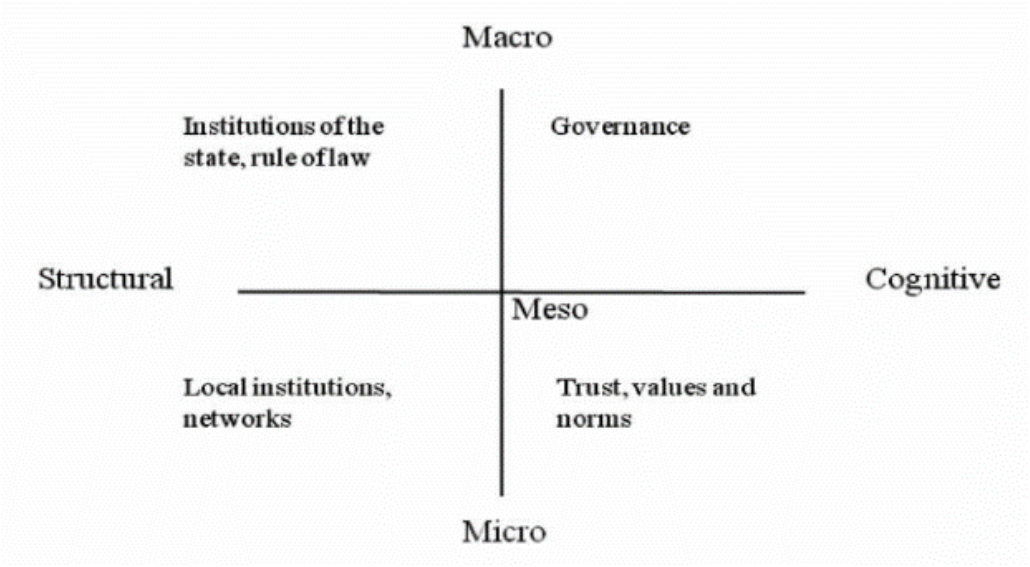


**Figure 2. 2** The forms and scope of social capital

In the extant literature, the manifestation of social capital takes a great number of forms (for examples, see Table 2.2). For instance, an alternative construction of social capital is proposed by Krishna (2000), who advocates the institutional and relational dimensions of this concept. Besides what has been discussed above, other manifestations examine whether social capital involves strong (intensive and repeated) ties and weak (temporary and contingent) ties; is open (civically engaged and exercising open membership) or closed (protective and exercising closed

membership); is geographically dispersed or circumscribed; and is instrumental (membership as social collateral for individual wants) or principled (membership as bounded solidarity) (Heffron, 2001).

| Manifestations of social capital | Authors | Definition/Explanation |
|---|---|---|
| **External (Bridging)/ Internal (Bonding)/ Neutral (Both)** | Adler and Kwon (2002) | **External:** "… are outward looking and encompass people across diverse social cleavages." (Putnam, 2000)<br><br>**Internal:** "… are, by choice or necessity, inward looking and tend to reinforce exclusive identities and homogeneous groups." (Putnam, 2000)<br><br>**Neutral:** neutral on this internal/external dimension. (Adler and Kwon, 2002) |
| **Horizontal/ Vertical** | Serageldin and Grootaert (1998) | This approach is progressive, with the latter view encompassing the former one.<br><br>**The first view (horizontal)**: a set of horizontal associations, including networks of civic engagement and social norms, among people who have an effect on the productivity of the community. (Putnam, 1993)<br><br>**The second view**: "a variety of different entities, with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors – within the structure." (Coleman, 1988)<br><br>**The third view**: besides the horizontal and hierarchical associations included in the former two views, this view encompasses "the social and political environment that enables norms to develop and shape social structure." (Serageldin and Grootaert, 1998) |
| **Individual (Private)/ Organisational (Public)** | Inkpen and Tsang (2005) | **Individual**: It stems from individual relations.<br><br>**Organisational:** It stems from relations among organisations, nations, and regions. |

| | | |
|---|---|---|
| **Structural/ Cognitive** | Uphoff (2000) | **Structural:** "The structural category is associated with various forms of social organization, particularly roles, rules, precedents, and procedures as well as a wide variety of networks that contribute to cooperation." (Uphoff, 2000)<br><br>**Cognitive:** "The cognitive category derives from mental processes and resulting ideas, reinforced by culture and ideology, specially norms, values, attitudes, and beliefs that contribute to cooperative behaviour and MBCA." (Uphoff, 2000) |
| **Institutional/ Relational** | Krishna (2000) | **Institutional:** Structured, with rules and procedures guiding actors' behaviour, under the supervision of actors with well-recognised roles. (Krishna, 2000)<br><br>Relational: "more amorphous and also more diffuse." (Krishna, 2000) |
| **Stock/Flow** | Krishna (2000) | Social capital is considered as a range of assets (stock) that generates benefits (flow). |
| **Family structure** | Ostrom (2000) | |
| **Shared norms** | Ostrom (2000) | |
| **Conventions** | Ostrom (2000) | |
| **Rule systems** | Ostrom (2000) | |

**Table 2. 2** Manifestation of social capital

### 2.2.3 Key contemporary authors on social capital

Pierre Bourdieu, James Coleman, and Robert Putnam have been regarded as the most influential, seminal fathers of the concept of social capital (Field, 2008, Adam and Rončević, 2003). These three researchers have unique backgrounds and have consequently investigated social capital from different perspectives and placed varying emphases. Bourdieu is considered a pure sociologist, Coleman is a sociologist with a strong association with the rational-choice theory based on economic analysis, and Putnam, a political scientist, is the most popular of the three (Adam and Rončević, 2003).

Adam and Rončević (2003) consider Bourdieu to be an early developer of this concept who shaped the frame of reference for theorising and exploration for the following

studies in his field. Field (2008) acknowledges Bourdieu's role as an important figure in converting social capital "from being a metaphor to becoming a concept". Bourdieu (1973) originally defined social capital in his first published discussion as "useful supports", which embodies honourability and respectability for attracting clients (Field, 2008). According to Field (2008), this view was then refined to be an "aggregate of the actual and potential resources which are linked to possession of a durable network" (Bourdieu, 1980, Bourdieu, 1986), where density and durability of social ties are of crucial importance. This definition has inspired many variations, one of which is proposed by Portes (1998) and refers to social capital as "the ability to secure benefits through membership in networks and other social structures". With regard to research trends and debates regarding social capital, this variation is considered the most important version (Adam and Rončević, 2003). Bourdieu's approach to defining social capital is exemplified within his critical theory of society, which differs from the normative approach taken by Putnam and Coleman as well as the network-based utilitarian approach of Burt and Lin (Adam and Rončević, 2003). Bourdieu's contribution is influential but flawed because his view is too outdated and individualistic and lacks considerations of the "dark side" of social capital (Field, 2008).

James Coleman is devoted to drawing upon economics and sociology to develop an interdisciplinary social science (Field, 2008). Field (2008) describes Coleman's definition as both abstract and functionalist when comparing it to Bourdieu's:

> *"Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors whether persons or corporate actors within the structure." (Coleman, 1988)*

Coleman's development of this concept, as has been discussed in the previous sections, includes both vertical and horizontal associations and both positive and negative objectives (Serageldin and Grootaert, 1998). In his later studies, Coleman (1990) complement this definition by emphasising the indispensability of social

capital in supporting certain actions: “like other forms of capital, social capital is productive, making possible the achievement of certain ends that would not be attainable in its absence” (Adam and Rončević, 2003). Coleman’s attempt to conceptualise social capital is regarded as a shift from Bourdieu’s egocentric perspective to a sociocentric perspective, a move from individual outcomes to outcomes for groups, organisations, institutions or societies (Adam and Rončević, 2003). Bourdieu’s conceptualisation also acknowledges that interactions among privileged individuals maintain their positions (“somewhat circular”), whereas Coleman’s treatment of social capital includes all actors, regardless of their positions or privileges. Furthermore, Bourdieu’s view acknowledges both dark and bright sides, while Coleman’s is relatively naïve and discerns little or no “dark side” (Field, 2008).

Compared to Bourdieu and Coleman, whose reputation stays within the boundaries of sociology and social theory, Putnam’s contribution extends beyond political science and has reached a wider public, making him the dominant voice on the topic of social capital (Field, 2008). His conceptualisation draws on Coleman’s productive and achievement-enhancing version of social capital (Adam and Rončević, 2003) and states:

> *“Social capital here refers to features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions*.” (Putnam et al., 1993)

This definition identifies the three primary ingredients – trust, norms, and networks – of social capital, and has not changed significantly since 1993 (Field, 2008). As proposed by Nahapiet and Ghoshal (1998), these three major elements have since formed the core idea of the three dimensions of social capital. Apart from his conceptualisation of social capital Putnam’s contribution extends to the measurement of this concept through extensive empirical research, one of which being the well-known and widely-applied “Putnam Instrument” (Adam and Rončević, 2003). Field (2008) describes Putnam’s contribution as “monumental”, but with flaws.

Putnam has been under attack due to his adoption of a "circular definition", celebratory tone, underestimation of political science, and distortion towards sociology (Field, 2008).

## 2.3 Social capital theory and its application in supply chain management

As discussed above, the lack of a universally-accepted definition of social capital has given rise to varying interpretations of this concept (Grootaert and Van Bastelar, 2002). Within management research, Matthews and Marzec (2012) acknowledge Sumatra Ghoshal as a central figure in developing social capital into a valid construct. Through reviewing previous studies on social capital, Nahapiet and Ghoshal (1998) define social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit", and further propose that social capital should be categorised into three highly interrelated clusters: the structural, the relational, and the cognitive dimensions of social capital.

Structural social capital leans upon associations among participants and network configurations inside a social structure (Villena et al., 2011). Drawing upon the discussion of structural and relational embeddedness proposed by Granovetter (1992), Nahapiet and Ghoshal (1998) define the structural dimension of social capital as the overall patterns of associations between actors, covering structural configuration, diversity, centrality, as well as the boundary-spinning roles of network participants (Krause et al., 2007). This dimension is further described by Burt (1992) as "who you reach and how you reach them". The structural dimension of social capital is often simplified and operationalised as social interaction ties (Tsai and Ghoshal, 1998, Carey et al., 2011). It can be examined through network ties, network configuration, and network stability (Inkpen and Tsang, 2005). Network ties depict the way actors are related and provide opportunities for social capital transactions (Adler and Kwon, 2002). Network configuration depicts the patterns of linkages among participants, from the perspectives of hierarchy, density, and connectivity.

Finally, network stability is the change of membership within a network. With members constantly changing, the opportunities to maintain social capital would be limited and costly (Inkpen and Tsang, 2005).

The relational dimension of social capital rests on direct ties between actors and the relational outcomes of interactions (Inkpen and Tsang, 2005). Nahapiet and Ghoshal (1998) refer to the argument of Granovetter (1992) and define relational capital as the trust, obligations, respect, and friendships developed with others through a history of interactions. Through repeated transactions, the abovementioned resources are developed to strengthen these relationships over time (Villena et al., 2011). Although both trust and trustworthiness are critical aspects of relational capital (Putnam, 1993, Nahapiet and Ghoshal, 1998), in many studies this dimension is operationalised as trust only (Coleman, 1990, Inkpen and Tsang, 2005, Villena et al., 2011, Li et al., 2014). In the review of Tsai and Ghoshal (1998), trust is identified as an attribute of a relationship and regarded as a governance mechanism for the relationships embedded in social networks (Uzzi, 1996), whereas trustworthiness is an individual attribute (Barney and Hansen, 1994).

Nahapiet and Ghoshal (1998) follow the idea of Cicourel (1973) and define cognitive capital as the "resources providing shared representations, interpretations, and systems of meaning among parties". Major manifestations of cognitive capital include common values and a shared vision (Tsai and Ghoshal, 1998), as well as shared culture and congruent goals (Inkpen and Tsang, 2005). Through a shared vision, a loosely coupled organisation can be held together and further integrated (Tsai and Ghoshal, 1998). Furthermore, a shared vision works as a bonding mechanism, which shapes organisation members' perceptions of interaction norms and reduces misunderstandings and conflicts through collective goals and aspirations (Tsai and Ghoshal, 1998), which depicts the extent to which social relationships are dominated by behavioural norms, and the extent of common understanding of task achievements.

In the context of supply chain management, conceptualisations of social capital vary according to the context and the scope related to the specific application. Autry and Griffis (2008) acknowledge the limited use of social capital theory in the context of "multi-organization" or issues at supply chain level. The link between social capital theory and supply chain management is explained by Autry and Griffis (2008) from two perspectives in a study exploring the influences of structural and relational linkages on firm execution and innovation. These two perspectives cover the key elements of social capital: relationships and resources. For the former, Autry and Griffis (2008) argue that companies embedded in supply chains are interconnected with other organisations and that each company has varying levels of "relational closeness" to its business partners; for the latter, the authors argue that the link between social capital theory and supply chain management stems from the transitive resource exchange perspective and that the concept of resource exchange has strong implications for organisations from the supply chain management perspective. Structural and relational value can be obtained from both direct contacts and indirect connections through "relational conduits" enabled by direct associates (Borgatti and Foster, 2003). Networks provide the infrastructure for access to resources derived from the accumulation of social capital. Like individuals acting in a social network, companies have access to goods, knowledge, and services by leveraging their networks (Autry and Griffis, 2008). From the perspectives of structural and relational embeddedness, Autry and Griffis (2008) define supply chain (social) capital as "the value of a firm's supply chain network, derived from both the structural configuration and the nature of direct and indirect relationships present within the supply chain".

In contrast to the two-dimensional conceptualisation proposed by Autry and Griffis (2008), Min et al. (2008) take a broader view on this concept and define social capital in the context of supply chain management as "the set of social resources embedded in the relationships within a supply chain, … (including) not only relationships per se but also the interactions among different actors and the processes derived from those

interactions within a supply chain". This definition has been adopted by Yim and Leem (2013), who have also extended the meaning of supply chain social capital along the structural, relational and cognitive dimensions. The structural dimension of the supply chain social capital network positionsocial interactions and social ties of a supply chain actor, who can identify business opportunities and obtain resources, for example, information and knowledge, through social interactions (Tsai and Ghoshal, 1998). The relational dimension of social capital in the context of supply chain management is the trust and commitment embedded in supply chain relationships, and the production and maintenance of collective assets within the supply chain (Uzzi, 1996). The cognitive dimension of supply chain social capital stems from shared organisational values and norms that support the achievement of shared goals within the supply chain (Tsai and Ghoshal, 1998, Yim and Leem, 2013).

In the scope of supply chain management, social capital guides the organisations within a social network to develop supply chain capabilities, which filters out appropriate partners and creates a strategic alliance (Matthews and Marzec, 2012). In their systematic literature review on the use of social capital theory in operations management, Matthews and Marzec (2012) identify four major themes of studies on supply chain management referring to social capital theory. Firstly, the majority of the studies that use social capital theory as a theoretical lens explain the variance in performance in buyer-supplier relations. In this branch, researchers referring to relational capital constitute a vast majority, for example Cousins et al. (2006), Lawson et al. (2008), Ketchen Jr and Hult (2007), and Panayides and Lun (2009). Relational capital, often in the form of trust, enhances buyer performance (Lawson et al., 2008, Cousins et al., 2006), knowledge transfer between supply chain partners (Ketchen Jr and Hult, 2007), performance relating to supplier development activities in terms of quality, delivery and flexibility (Krause et al., 2007), and innovativeness (Panayides and Lun, 2009). It is also capable of reducing transaction cost (Ketchen Jr and Hult, 2007) and limiting opportunistic behaviour that is detrimental performance (Adler and Kwon, 2002). Given the proportion of studies involving the relational capital, the

uneven attention attached to relational capital and the other two dimensions to some extent constrains the theoretical contribution of studies exploring the role of social capital within the context of supply chain management (Krause et al., 2007). Cousins et al. (2006) highlight the influence of the structural capital, in the form of informal social interactions, over performance, which turns out to be greater than formal socialisation. Krause et al. (2007) address different aspects of each dimension in improving performance (for a detailed discussion, refer to Krause et al. (2007) and Matthews and Marzec (2012)).

The second theme is the interrelations among the three dimensions of social capital. The articles by Handley and Benton Jr (2009), and Singh and Power (2009) are highlighted in this branch as they explain how one dimension is developed through the others, which inspires companies to develop stronger relationships with their trading partners. The third theme is built upon relational capital and highlights social capital when explaining outcomes of strategic alliance, which can be mainly categorised into either organisational learning or innovation in the forms of new intellectual capital (Panayides and Lun, 2009), open innovation (Ireland and Webb, 2007, Smart et al., 2007), and the co-development of technology with buyers (Zhang et al., 2009). The fourth theme focuses on the role of community-based control mechanisms within the context of supply chain management. This branch of studies is based on the statement of Putnam (1995) in *Bowling alone: America's declining social capital* that the cognitive dimension of social capital is related to social embeddedness and cultural norms. Social capital regulates actors' behaviour through community-based responsibility systems (Agarwal and Shankar, 2003) and peer-to-peer control mechanisms in the form of social norms that fulfil adherence to codes of conduct (Cadilhon et al., 2003, Batt, 2003, Jiang, 2009).

Villena et al. (2011) are among the few researchers who have looked into the dark side of social capital in the context of supply chain management. Their study confirms the inverted curvilinear relationship between social capital and a buyer's strategic and

operational performance, and that extremely high social capital reduces buyers' objectivity and effective decision making, and increase opportunistic behaviour among suppliers (Villena et al., 2011).

## 2.4 Social capital: two sides of a coin

Matthews and Marzec (2012) propose three areas within supply chain management referring to social capital theory with the potential for further exploration. These areas include the incorporation of less routine, more strategic exchanges, employment of all three dimensions, and, most importantly, consideration of the pitfalls of social capital. The aforementioned major branches of studies using social capital theory as a theoretical foundation explore the positive outcomes of cultivating and maintaining social capital; however, social capital has never been a one-sided, simple concept. A limited number of studies on social capital theory have discussed both sides of this resource within the contexts of their research scopes. For example, Inkpen and Tsang (2005) advance further investigations into the risks of social capital in enabling knowledge transfer for consideration of the "blind spot" and the inhibition of knowledge flow caused by over-embeddedness. Granovetter (1985) highlights the likelihood of opportunism due to social embeddedness, while Villena et al. (2011) explain the way social capital enhances and deteriorates a buyer's performance. Adler and Kwon (2002) have identified three major outcomes of social capital as information, power, and solidarity, and discussed these outcomes from the perspectives of both benefits and risks.

Combining these researchers' ideas and their theoretical foundations, Table 2.3 presents a comparison of the bright and dark sides of social capital. It is expected that the desirable results caused by social capital are more heavily exploited than the undesirable ones. Social capital gives rise to a series of outcomes, including information, performance variation, control, knowledge sharing, and supply chain collaboration. Among these outcomes, information, performance, and control over business partners are the three most discussed outcomes that have been explored

from both sides and are closely related to the three dimensions of social capital, respectively.

### 2.4.1 Information resources

Discussion regarding information as an outcome of social capital primarily revolves around the structural dimension, with some exceptions focusing on relational capital (often in the form of trust) and cognitive capital (Sukoco et al., 2018, Lee and Ha, 2018). Li et al. (2014) regard structural capital, often in the form of social interactions, as a channel for information sharing as it extends resource exchange potentials and facilitates access to valuable information resources (Coleman, 1988, Nahapiet and Ghoshal, 1998). Some argue that frequent social interactions allow the exchange of more important and valuable information (Li et al., 2014) because the extent of resource exchange grows as the frequency of social interactions increases (Tsai and Ghoshal, 1998). Information of higher quality, relevance and timeliness is available from broader sources facilitated by social capital (Adler and Kwon, 2002). More precisely, information diversity can be achieved through weak ties in social networks (Hitt, 2011). “Fine-grained” information, accessed through the brokering activities along networks, leads to a better forecast of future demands and more accurate understanding of customer preferences (Uzzi, 1997, as cited by Adler and Kwon, 2002). Embeddedness provides the focal actor access to information and integration of information acquired from several independent relationships through structural holes (Hitt, 2011).

Despite this embedded nature, however, access to diversified information from broader sources can sometimes be a poisoned chalice. Social ties that facilitate information exchange are expensive to build and maintain (Adler and Kwon, 2002). Unlike Nahapiet and Ghoshal (1998), who propose the three widely-accepted dimensions of social capital, Koka and Prescott (2002) parcel out social capital into dimensions of information richness, information volume, and information diversity, and highlight the redundancy in information sharing caused by social capital. Under

these circumstances, information overload and equivocality creates a cognitive burden at the receiving end of the information flow (Grover et al., 2006). Furthermore, excessive social interactions pose a distraction from critical business activities (McFadyen and Cannella, 2004).

### 2.4.2 Performance variation

Social capital, especially relational embeddedness, is considered to be a critical antecedent to performance (Bernardes, 2010). On the buying end of a supply chain, social capital greatly boosts buyers' performance (Villena et al., 2011, Krause et al., 2007, Yim and Leem, 2013, Lawson et al., 2008). At the supply end, social capital significantly stimulates innovation among suppliers (Kim et al., 2017). Social capital improves performance from multiple perspectives. It creates strategic value and enhances environmental performance for NGOs through collaboration (Johnson et al., 2018). Operational performance may be improved directly in terms of product quality, the flexibility of processes, lead time reduction, and current processes (Villena et al., 2011). Building social capital also aids investment in internal collaborative process competence, thus indirectly improving such performance (Whipple et al., 2015). Without an adequate level of social capital, such investment is completely in vain.

Performance reduction, as a negative outcome of social capital, can be mainly explained from the perspective of cognitive and relational social capital. Since the cognitive dimension of social capital is cultivated and accumulated through common values, a shared business vision (Tsai and Ghoshal, 1998), shared culture and congruent goals (Inkpen and Tsang, 2005), it is likely to cause "groupthink" (Janis, 1982), "isomorphism" (Uzzi, 1997), and loss of creativity (Autry and Griffis, 2008), ultimately resulting in performance loss (Villena et al., 2011). Relational capital hurts performance by making buyers vulnerable (Villena et al., 2011). When high relational capital is present buyers will avoid conflicts to maintain bonds, resulting in a loss of optimal solutions caused by the lack of timely, accurate feedback (Jeffries and Reed, 2000).

### 2.4.3 Power and control

| Outcomes of social capital | Bright side | Dark side |
|---|---|---|
| **Information** | • Information sharing enhanced by social capital (Sukoco et al., 2018, Lee and Ha, 2018), in aspects of:<br>• Broader source (Adler and Kwon, 2002)<br>• "Fine-grained" information" (Uzzi, 1997)<br>• Diversity (Hitt, 2011)<br>• Integration of information obtained from several independent relationships (Hitt, 2011) | • Expensive to build and maintain (Adler and Kwon, 2002)<br>• Redundant information (Coleman, 1990, Koka and Prescott, 2002)<br>• Distraction from critical activities due to excessive interactions (McFadyen and Cannella, 2004)<br>• Cognitive burden (Grover et al., 2006) |
| **Performance** | • Social capital improves:<br>• Performance (Bernardes, 2010)<br>• Environmental performance (Johnson et al., 2018)<br>• Operational performance (Whipple et al., 2015, Villena et al., 2011)<br>• Buyer performance (Villena et al., 2011, Krause et al., 2007, Yim and Leem, 2013, Lawson et al., 2008)<br>• Supplier innovation performance (Kim et al., 2017) | • Too little or too much social capital hurts performance (Villena et al., 2011) due to "groupthink" (Janis, 1982), "isomorphism" (Uzzi, 1997), and loss of creativity (Autry and Griffis, 2008)<br>• Loss of timely, accurate feedback to avoid conflicts (Villena et al., 2011) |
| **Control** | • Social capital gives rise to influences, power, and control over other parties to get accomplishments (Adler and Kwon, 2002)<br>• Solidarity reduces the need for formal control (Adler and Kwon, 2002) | • Less dependency on the focal factor (Adler and Kwon, 2002)<br>• Occasions for opportunistic behaviour (Granovetter, 1985)<br>• Opportunistic, cheating suppliers (Gargiulo and Ertug, 2006, Wuyts and Geyskens, 2005, Anderson and Jap, 2005)<br>• Excessive, unnecessary obligations for the buyer (Uzzi, 1997, Bendoly and Swink, 2007)<br>• Reluctance to switch suppliers (Villena et al., 2011) |
| **Knowledge** | • New skills acquired through inter-organisational networks<br>• Knowledge transfer from buyer to | |

| | |
|---|---|
| | supplier<br>• Enhanced exchange behaviour (Kim et al., 2012, Sukoco et al., 2018, Handoko et al., 2018) |
| **Collaboration** | • Social capital enhances supply chain collaborations (Wu and Chiu, 2018) and strategic alliance (Sambasivan et al., 2013).<br>• Willingness in participation (Peng et al., 2018)<br>• Relational stability in an alliance (Yang et al., 2008) |
| **Others** | • Protection from uncertainty for small business (Prasad et al., 2012).<br>• Joint sense-making (Sukoco et al., 2018)<br>• More resilient supply chain (Johnson et al., 2013)<br>• Supply chain integration (Yim and Leem, 2013, Chen et al., 2018) |

T**able 2. 3** A comparison of outcomes of social capital

Solidarity is considered a major benefit of social capital as it reduces the need for formal control (Adler and Kwon, 2002). It also facilitates the focal actor with power, influence, and control over others to achieve its goal (Adler and Kwon, 2002). However, such benefits can be offset by information benefits introduced by social capital (Adler and Kwon, 2002). The focal actor might enjoy broader sources of information empowered by embeddedness within a social network from both direct contacts and indirect contacts. Meanwhile, as explained by Adler and Kwon (2002), the focal actor will have reduced control over its direct contacts because these direct contacts have their own direct contacts (Ahuja, 2000).

Whether the abovementioned power is beneficial is a matter of perspective. The imbalance of power in a relationship, caused by stickiness to a certain business partner and a reduction in control mechanisms (Villena et al., 2011), is bound to put one party in a weaker position. In the first place, driven by the fear of possibly losing

relationship-specific assets (Anderson and Jap, 2005) and attachment to the continuity of existing relationships (Kim et al., 2006), the reluctance to switch suppliers is one an indicator of the vulnerability of a buyer (Villena et al., 2011). Secondly, loss of control is caused by high relational capital, in the form of trust, which creates an opportunity for opportunistic behaviour (Granovetter, 1985). It also reduces the buyer's alertness regarding misconduct from the supplier. Both reluctance to replace the supplier and reduction in control mechanisms vest power in the supplier to take advantage of the buyer. Under these circumstances, the supplier is likely to systematically cheat the buyer and exert unnecessary obligations to its own benefits (Villena et al., 2011).

## 2.5 Trustworthiness concerns induced by social capital in supply chain management

Trust and trustworthiness go hand in hand. However, these two concepts are often mistaken for each other (Hardin, 1996, as cited by Wright, 2009). Therefore, it is crucially important to differentiate between the two. Based on previous studies from multiple disciplines, Beldad, de Jong and Steehouder (2010) identified a two-way stream to conceptualize trust. The first one sees trust as an expectation of the behaviour of a partner, while the second one regards trust as the acceptance of and exposure to vulnerability. Therefore, trust can be regarded as the trustor's willingness to expose his/her vulnerability to the trustee who is hoped to behave according to the trustor's expectations. In contrast, trustworthiness describes the probability that a trustee acts as expected by the trustor, as implicitly suggested by a number of researchers, including Rotter and Stein (1971), Mayer et al (1995), Levi and Stoker (2000), etc (Bauer, 2014). Mayer et al (1995) provide a framework that embodies trustworthiness into three dimensions: ability, benevolence and integrity. Ability is the group of skills, competences, and characteristics that enable a party to have influence within some specific domain. Benevolence is the extent to which a trustee

is believed to want to do good to the trustor. Integrity is the trustor's perception that the trustee adheres to a set of principles that the trustor finds acceptable.

Based on the conceptualizations above, the major difference between trust and trustworthiness lies in the subject to which they belong. Trust is a situational state, which depicts a situation where at least two parties interact (Mayer et al, 1995), while trustworthiness is a personal trait. Not only does this distinction separate trustworthiness from trust, it also draws a line between trustworthiness and social capital, which is the resources and assets accumulated along social connections between two parties. Therefore, it is reasonable to suggest that trust and trustworthiness do not always correspond at the same level. Social interactions (Frank, Gilovich, & Regan, 1993), information about the trustee's moral character (Delgado, Frank, & Phelps, 2005) can influence the trustor's judgement of the trustee's trustworthiness (Chang et al., 2010).

Mayer et al's (1995) framework incorporates ability, benevolence, and integrity as the core of interpersonal trustworthiness. On an organizational level, trustworthiness includes a related but uniquely different set of seven duties, which is directly comparable to Mayer et al (1995) model of interpersonal trustworthiness (Caldwell et al., 2001, Caldwell and Clapham, 2003):

- Competence - Competence includes the level of knowledge and ability to achieve results associated with the purposes of an organization.
- Quality Assurance – Quality assurance addresses the extent to which standards of quality are understood and adhered to on a continuous basis to achieve desired outcomes.
- Interactional Courtesy – Interactional courtesy encompasses the degree of respect and courtesy shown to others in performing organizational duties.
- Procedural Fairness — Procedural fairness includes the extent to which stakeholders are given the opportunity to participate in fair processes and systems associated with the formal and informal practices of the organization.

- Responsibility to Inform - Responsibility to inform incorporates the level of communication provided to stakeholders who have an interest in organization objectives and outcomes.
- Legal Compliance — Legal compliance refers to the degree to which applicable laws are understood and followed.
- Financial Balance - Financial balance includes the ability of the organization to achieve both efficiency and effectiveness in accomplishing organizational results.

In the context of information sharing in supply chain, trust means that on the receiving end of the information flow, the trustor willingly uses the shared information to make business decisions regardless of any potential bad consequences. Trustworthiness means that the trustee, who shares information with the trustor, has the competence to deliver information of desirable quality in accordance with certain Interactional courtesy and law. Trustworthy trustees do not distort, delay or manipulate information to gain advantage.

In this study, trustworthiness is examined from the perspective of opportunistic behaviours which are affecting the benefits of a company. Carter (2000a) identifies a list of actions perceived to be unethical by suppliers. This list is then shortened to behaviours that are conducted for one's own benefit at the expense of someone else (see Table 2.4). Thus, we adopt the definition of unethical behaviours proposed by Eckerd and Hill (2012a): "unscrupulous activities a buying firm is perceived to undertake for its own self-interest". This set of actions is sometimes referred as "opportunistic behaviour" in some context. In this study, the term "opportunistic behaviour" is retained to be more precise. In the following sections, "unethical behaviour" is discussed within the boundary of opportunism. Within this scope of behaviour, we examine the perceptional trustworthiness of a firm.

Unlike most of the studies that view social capital from structural, relational and cognitive perspectives, Ayios et al. (2014) acknowledge an additional dimension of social capital – the ethical dimension – in reference to the moral components of social

relationships proposed by Pastoriza et al. (2008). The following sub-sections cover the explanation of the key terms and then explore the double-sided role of social capital in supply chain management.

| | Details | Achieved through information sharing? |
|---|---|---|
| **Deceitful practices** | Inventing (making up) a second source of supply to gain a competitive advantage | Yes |
| | Using obscure contract terms to gain an advantage over suppliers | |
| | Exaggerating the seriousness of a problem to gain concessions | Yes |
| | Purposefully misleading a salesperson in a negotiation | Yes |
| **Subtle practices** | Giving preference to suppliers preferred by top management | |
| | Allowing personalities of the supplier to impact decisions | |
| | Writing specifications that favour a particular supplier | |

Notes: *considered unethical by both suppliers and buyers

**Table 2. 4** Unethical behaviours, taken from Carter (2000b)

### 2.5.1 Ethical concerns in buyer-supplier relationships

"Doing good" in a given human situation has been regarded as the core idea of ethics (Wilson, 1975, Bendixen and Abratt, 2007). It includes the set of moral principles or values of that behaviour (Sherwin, 1983). When placing this concept in the context of business and management, De George (2011) describes "business ethics" as the interaction of ethics and business. Business activities are judged and evaluated based on moral principles. As cited by Bendixen and Abratt (2007), Bartels (1967) regards ethics as a standard to judge business actions as "right" or "wrong" by considering whether the expectation of the other is violated or fulfilled, instead of in an absolute sense. Based on its own value and judgement, evaluation of a business activity regarding its ethicality depends largely on one party's perception and highly subjective. Gilbert and Malone (1995) propose three types of approaches to evaluate the ethicality of a certain action (Taylor and Fiske, 1975). Utilitarian-based approaches

examine the overall effects of the behaviour on the welfare of each individual/party involved, rights-based approaches focus on the influence on the individuals' entitlements, and justice-based approaches concern the fairness in the distribution of benefits and burdens under the impacts of the discussed behaviour. Significant subjectivity is a serious concern in these approaches because one specific action might be interpreted completely differently by two individuals from their own respective standpoints (Taylor and Fiske, 1975).

This method of assessment is also applicable in investigations into ethical issues in the context of supply chain management. Opportunism has been regarded to constitute a major part of unethical behaviour; for example, Eckerd and Hill (2012a) define unethical behaviour as "unscrupulous activities a buying firm is perceived to undertake for its own self-interest". The survey items in this study partly stem from Carter (2000a), who proposes a more comprehensive definition of this term. Carter (2000a) defines unethical behaviour in the supply chain as "the specific set of actions taken within the buyer-supplier relationship that are considered unethical by purchasing managers". This definition is drawn upon a list of activities perceived to be unethical by both suppliers and buyers through literature review and group interviews. For further clarification, this set of unethical actions is further divided into "deceitful practices" and "subtle practices". Deceitful practices refer to the set of intentional deceptive actions with a clear, recognisable outcome, such as making up a second source of supply to gain a competitive advantage (Carter, 2000b). Subtle practices appear to be relatively more discreet, for instance writing specifications that favour a particular supplier and allowing the personalities of the supplier to impact decisions (Carter, 2000b).

### 2.5.2 Social capital and untrustworthiness

The dark side of social capital has been briefly discussed in the previous sections. There are two major causes of the undesirable consequences of inadequate social capital levels. Some of the drawbacks result from goodwill. Actors in the supply chain

interact with others using a clean slate of honesty, hoping for more benefits and better performance through cooperation, yet somehow end up with the opposite outcome. This "good intention, bad result" phenomenon is usually caused by excessive social capital. For example, sharing information that exceeds the other party's processing capability unknowingly will cause a cognitive burden on the receiving end (Grover et al., 2006). Unnecessary social interactions, hoping to develop a more solid friendship, sometimes distract from critical activities that boost performance (McFadyen and Cannella, 2004). Companies holding high cognitive social capital are likely to think alike and cause "groupthink" (Janis, 1982) and "isomorphism" (Uzzi, 1997), ultimately leading to limited creativity and loss in performance (Villena et al., 2011).

In contrast to the undesirable outcome caused by "good intentions", some negative consequences are realised by behaviour empowered by "bad intentions", which aim to either sabotage others or gain benefits by taking advantage of others. Opportunism, cheating, and creating unnecessary obligations, as have been discussed in previous sections, all belong to this category. As discussed previously, social capital creates significant benefits by enabling information flow between the two parties. Meanwhile, its risks are not to be discounted, since such resources are subject to high selectivity and manipulation that can generate inequalities and perverse outcomes (Ayios et al., 2014). Distorted information can be passed on to business partners to achieve self-interest goals. When exploring the precursors of unethical behaviour in global supplier management, Carter (2000b) presents a list of deceitful practices and subtle practices (see Table 2.4), nearly half of which are realised through the manipulation of shared information between suppliers and buyers.

### 2.5.3 Perception of trustworthiness in supply chain

The ethicality of a certain action is subject to considerable subjectivity, which gives rise to varying interpretations of one specific activity. It is vital to note that these interpretations do not always correctly and accurately reflect reality and the true

intentions of the ones being observed. An act of goodwill is likely to be perceived as hostility, and this is also the case with ethicality.

Handley and Benton Jr (2009) use attribution theory to explain the incongruence between the perceptions of unethical behaviour and reality. Attribution theory involves a perceiver, a target (the one being observed) and attributions (explanations perceivers make to understand the target's behaviour); it depicts the process by which perceivers try to observe, analyse and explain the target's behaviour. Attributions can be either personal/internal, reflecting "inner states, abilities or attitudes", or situational/external, reflecting "current social and environmental pressures" (Buckley et al., 2000). Instead of the actual cause of a certain behaviour, attribution theory focuses on one's perception or inference of this cause, which is likely to deviate from reality to some extent. The lack of objectivity leads people to make perceptual errors and biased interpretations of the behaviour of others (Funder, 1987). This bias results from the use of heuristics by perceivers to make an inference, which is caused by either the lack of motivation/time or proper cognitive abilities/training to apply attribution theory to generate explanations (Buckley et al., 2000).

In the extensive list of attribution biases, fundamental attribution bias and actor-observer asymmetry are the most closely related to understanding and perception of opportunistic behaviour. Ross (1977) labels the tendency to underestimate the impact of external attributions and overestimate the impact of internal attributions when explaining others' behaviour as "fundamental attribution error" (Forgas, 1998). The actor-observer effect explains why people interpret their own behaviour and others' behaviour differently. For Jones and Nisbett (1971), the actor-observer effect is "a pervasive tendency for actors to attribute their actions to situational requirement" and a tendency for observers to "attribute the same actions to stable personal dispositions" (Buckley et al., 2000). These biases indicate that attributions/perceptions cannot always truly reflect reality. What is perceived to be

opportunistic may be otherwise under certain circumstances; for example, when a retailer adjusts its listing and delists a product from a manufacturer, this manufacturer is likely to perceive this action as a sign of opportunistic competition (internal attribution) instead of a measure to survive in a highly competitive business environment (external attribution).

Forgas (1998) and Buckley et al. (2000) explain the causes of fundamental attribution bias and actor-observer bias respectively. These biases mainly result from two factors. The first one is the focus of attention. The actors focus on external factors, such as environmental attractions, repulsions, and constrains, to which they respond by making a move (Buckley et al., 2000). In contrast, as proposed by Taylor and Fiske (1975), observers selectively pay attention to the actors themselves, which is "the most conspicuous, accessible and easily processed information" factor. Consequently, they overlook the external factors (Forgas, 1998). The second factor is information. Buckley et al. (2000) also explain the actor-observer effect from the perspective of information availability as actors have more information about their behaviour patterns compared to observers. Unusual behaviour is interpreted from an external perspective by actors, while observers attribute such behaviour to actors' internal factors due to the lack of information about their past behaviour modes (Buckley et al., 2000). Moreover, Forgas (1998) argues that the ability and motivation to process complicated information prevents observers from forming more similar attributions compared to actors. Processing situational information mixed with internal causality is demanding and calls for a systematic method, which is more complicated and may not always be adopted (Gilbert and Malone, 1995).

### 2.5.4 Social capital: a control mechanism

The interaction between social capital and trustworthiness is delicate and complicated. Besides enabling opportunistic behaviour, social capital also works as a control mechanism to enhance trustworthiness, which constrains the actions that go against certain mutually-agreed or widely-accepted norms and expectations.

The three dimensions of social capital restrain opportunistic behaviour in different ways. The control over opportunistic behaviour imposed by structural capital is realised through social embeddedness and social interactions. The way social embeddedness suppresses opportunistic behaviour is highlighted by Eckerd and Hill (2012a), who have identified the negative correlation between supplier-supplier networking and the supplier's perception of the buying firm's opportunistic behaviour. In supplier-supplier networks, suppliers share information regarding the reputation of both potential and current business partners (McCarter and Northcraft, 2007). In a network like this, a buyer firm's reputation precedes it. Under the pressure of the associations among suppliers, buyers are compelled to act within certain norms and expectations (Eckerd and Hill, 2012a). As for social interactions, Inkpen and Tsang (2005) advocate "the shadow of future", which is lengthened by frequent partner interactions, in restraining opportunism and promoting cooperation (Parkhe, 1993).

To some extent, structural capital forces actors to behave in an ethical manner because failing to do so might cause reputational damage. In contrast, the limitation of opportunistic behaviour, realised through relational and cognitive dimensions, relies heavily on actors' self-regulation and consciousness. The lack of external regulating forces can be attributed to the nature of contracts and agreements, which, on their own, do not exhibit any control over opportunistic behaviour (Sako, 2006). The absence of control is filled by relational capital, which limits actions carried out of self-interest and reduces the need for formal contractual agreements (Matthews and Marzec, 2012). Trust, a key aspect of relational social capital, is developed through a history of repeated business transactions, preferably with positive outcomes (Adler and Kwon, 2002). During this process, concern regarding business partners' integrity decreases as trust, friendship, respect, and reciprocity develops (Villena et al., 2011). As explained by Villena et al. (2011), decision makers are devoted to maintaining their organisations' reputation as trustworthy business partners while simultaneously developing mutual confidence that they will not take advantage of others' vulnerability (Sabel, 1993).

Since cognitive social capital stands for shared culture, a shared business vision and goal congruity, it is reasonable to infer that cognitive capital suppresses opportunistic behaviour on one condition: the objectives of two firms do not go against each other. Thus, inter-firm rivalry, a discrepancy of purposes and behaviour between business partners (Park and Ungson, 2001) is controlled within an acceptable scope for both firms. Matthews and Marzec (2012) highlight social identity theory, which suggests that an individual's behaviour depends on his or her identity within a community (Robertson et al., 2003) to explain the way shared norms in the community regulate individuals' behaviour to achieve the collective interest. When developing cognitive capital, the participating firms gain a better understanding of behavioural norms through formulating a shared vision (Villena et al., 2011), based on which they understand how to act to obtain the collective interest. Once the interests of firms are aligned, the possibility of opportunistic behaviour is reduced because damage to one party's benefits would be passed on to those of the other.

## 2.6 Private labels

In a stable, well-operating and traditional supply chain ecosystem, suppliers and buyers rely on each other to deliver finished national brand products to store shelves from factories and warehouses. Undoubtedly, the introduction of a private label would disrupt the climate of this system because it represents a degree of disagreement in the business goals of both parties. Section 2.6 mainly discusses what happens when a business ally becomes a competitor. The following sub-sections cover the background of the private label, the recipe of the private label's success, and the way it impacts the dynamics between suppliers and buyers.

### 2.6.1 Background

A private label, also known as store brand, is a product or service manufactured, provided, and promoted under the name of a specific retailer. It is the opposite of a national brand, which is produced and distributed nation widely under the name of a

specific manufacturer or distributor.

Private labels have been gaining more and more attention since their first appearance in the grocery category in the retail market at the turn of the 20th century (Hoch and Banerji, 1993). The Great Atlantic & Pacific Tea Company (A&P) was the pioneer at the time, followed by Safeway and Kroger, who were both remarkable in the use and growth of private labels. Supermarkets, in their early form, acted as discounters. Self-service and non-traditional locations, such as vacant warehouses, were employed by these supermarkets to reduce costs. This practice was adopted by grocery chains, which occupied large self-service spaces to produce groceries under the store brand.

As reported by Statista (2015), private label fast-moving consumers goods (FMCG) sales had obtained an aggregate market share of approximately 16% across the globe by 2015. This rate is lower than that of many western European developed counties, such as Switzerland (44%), the United Kingdom (42%), Spain (40%), Germany (34%), and Belgium (31%) (Statista, 2015). For example, the collective market share of the "big four" (Sainsbury's, Tesco, Asda and Morrisons) grocers in the UK has dropped from 73% in 2012 to 66% in 2016 due to the aggressive expansion of German discount supermarket chains Aldi and Lidl, which keep prices low by limiting their inventory to a lean range of private label products (ACNielsen, 2018). The competition between private labels and national brands does not happen between discount supermarkets and traditional supermarkets only and has expanded to competition between retailers and their manufacturers as well. For example, more than 40% of Asda's merchandise listings are private label products, providing certain product categories where customer demand is high (Simpson, 2013). Among a list of private labels owned by Asda – for example, Asda Smart Price, George Clothing, Chosen By You – the Chosen By You series is Asda's biggest private label re-launch, forming a large part of a £100m investment in the range, price and quality of private labels (Simpson, 2013). The expansion of private labels puts the majority of national brand manufacturers in a weaker position. According to a report released by ACNielsen in

2014, despite the difference in the nature of products across multiple product categories, 40% of the total sales results from the leading products in the category, 41% from private labels and 19% from all other brands. Consequently, small- and medium-sized national brands/manufacturers are losing their market share to private labels, while national leading manufacturers are immune to the changes imposed by private labels (ACNielsen, 2014).

### 2.6.2 The rise of private labels

Retailers are motivated to create strong private label product lines based on the following considerations proposed by Steiner (2004). First, purposeful temporary subsidisation of private labels generates higher profits in the long term. Such subsidisation is viewed as a sign of goodwill for the store and enacts an "umbrella effect" for the retailer to expand the success of private labels in one product category to other categories (Borden, 1942). Second, the profitability of private label products is higher than that of the manufacturer's fringe brands. Third, strong private label programmes give retailers more bargaining power against manufacturers. Large private label product sales put the retailer in a better position to bargain with manufacturers for price concessions on the national brand product, which might be sold at a higher price to other competing and less threating retailers (Steiner, 2004).

The rise of private labels is not a coincidence. Numerous studies have investigated the success of private labels. For example, Draganska and Klapper (2007) investigated how retail characteristics affect competition intensity among upstream firms in the retail market, as well as market power. Since private labels have become an important part of the marketplace, Sethuraman and Gielens (2014) identify 20 determinants that show significant varied effects on private label market share. The success of private labels is the result of a combination of multiple factors, including the macro-economic environment, consumers, retailers, and product design. Economic conditions have established a promising environment for the penetration and prevalence of private labels. Consumers define the demand side of private labels

through their needs, expectations and behaviour (Hoch and Banerji, 1993). Retailers affect private label supply by their allocations of listings, which is also influenced by manufacturers of national brands (Hoch and Banerji, 1993).

a. Economic conditions and market structures

Economic conditions and market structures impose a significant influence on the prevalence of private labels. Reflecting on previous researches which assert that economic recessions boost private label popularity and that a flourishing economy reduces the private label market share (Quelch and Harding, 1996; Dickinson, 1994; Ang et al., 2000), Lamey et al. (2007) confirm these findings and extend the research to the next level by highlighting the "permanent scar" left by private labels on national brands following economic recessions. This research indicates consumers are more likely to buy private labels when the economy is suffering and some of them will stick to store brands even when the economy recovers. These shifting preferences result from lower prices. However, consumers' loyalty to private labels after a recession results from the contradicting marketing strategies of retailers and manufacturers. National brand owners tend to cut down marketing expenses during the recession, while retailers invest more in their products (Lamey et al., 2007). In addition, varied market structures in different regions result in different degrees of private label penetration. Modern trade and logistics structure development has contributed to an enlarged PLB market share. Due to the development of private labels by modern retailers, highly developed modern trade is necessary for the emergence of PLBs. Once produced, PLB products are transported throughout the nation. Therefore, a highly developed modern trade and logistics structure can be considered as a prerequisite of high PLB penetration (Cuneo et al., 2015).

b. Consumers

Hyman et al. (2010) have summarised five types of consumer-related factors that contribute to the success of private labels, including households' income level

(Collins-Dodd and Lindley, 2003), customers' rejection of the price-quality relationship (Swan, 1974), PLB-prone consumers, price-conscious customers (Baltas et al., 1997, Richardson, 1997), and high-store-loyal customers (Cotterill and Putsis Jr, 2001, Semeijn et al., 2004). These factors point to different tiers of store brand products with varying value dispositions.

Somervuori and Ravaja (2013) point out that low prices stimulate greater positive emotions that lead to greater purchase intent and affirmative purchase decisions. They attract households with lower income, whose budgets are only slightly stretched (Collins-Dodd and Lindley, 2003), price-conscious customers, who usually have low internal reference prices (Baltas et al., 1997, Richardson, 1997), and PLB-prone consumers, as explained by Hyman et al. (2010). However, for some customers, national brands tend to arouse greater positive emotions than private labels. Due to differences in marketing and manufacturing between national brands and private labels, consumers perceive national brands and private labels as having different quality levels. Because of this perceived quality gap, premium consumers are willing to pay for national brands over private labels (Steenkamp et al., 2010). In order to break the stereotype, retailers launch two-tier and multi-tier store brand products entitled "premium brand" or "value brand". However, consumers tend to perceive PL products as being of inferior quality even if they are described as premium brands (Palmeira and Thomas, 2011). When comparing a premium brand with a value brand, they think the premium brand is of higher quality. Consequently, multi-tier PL products sold at different prices aim to attract different customer segments by displaying multiple value propositions. Compared to segments of national brand buyers, overlapping across different PL products customer segments is less significant (Martos-Partal et al., 2015). This clearly indicates distinguished value proposition and value seeking behaviour among PL product consumers.

Furthermore, an ACNielsen (2018) report advocates the generation of millennials to be the source of purchasing power of private labels in the future and explains the

rationale behind this overwhelming trend. 24% of the global population is comprised of millennials, who are expected to replace baby boomers in the next five to ten years. Millennials' demand for FMCG has exceeded that of the older generation. The popularity of private labels is inevitably driven by the young generation because this generation is more open-minded to new things, including private labels. Private label products meet their expectations by offering more convenience and diversified lifestyle options (ACNielsen, 2018).

c. Product design

Product design is an important factor that constitutes the recipe for private labels' success. Hyman et al. (2010) have illustrated product-related factors for private labels' success from the perspectives of quality, price, and product category based on a discussion of previous literature. The product category choice is usually in the hands of retailers, which will be discussed in the next sub-section. Product quality and price are directly exposed and assessed by customers, who will eventually make the purchasing decision. Thus, it is crucial to match the quality and price features of a private label product to its customers' needs. For example, private label products with a lower price would attract price-conscious customers, while stable quality would attract customers who reject the traditional price-quality relationship.

d. Retailers

From a retailer perspective, Hyman et al. (2010) have summarised seven factors that contribute to the rise of private labels, including a similar positional strategy to NBs, the number of regional stores, the diversity of private label product categories, a good balance between PLB and NBs, a positive store image and pleasant store atmosphere, congruity between consumers' hedonic/functional beliefs about retailers and PLBs, and assigning PLB production to NBs.

Among these factors, the interaction between retailers and NB manufacturers is mainly reflected through the positional strategies of private labels, the diversity of

private label product categories, and the balance between PLB and NB products held in store. Through positioning strategies that are similar to those of national brands, private label products are viewed as a cheaper alternative (Ailawadi et al., 2001, as cited by Hyman et al., 2010). Similar positioning strategies not only increase retailers' advantages in negotiations with national brand manufacturers (Aggarwal and Cha, 1998) but also generate costs advantages (Hyman et al., 2010). However, mere imitation does not guarantee the profitability of private labels. Private label products cannot completely replace their national brands counterparts. A good balance between PLBs and NBs is of equal importance (Hyman et al., 2010) because retailers must rely on sufficient NB buyers to ensure the profitability of PLB products (Liu and Wang, 2008).

The diversity of private label products across categories conveys expertise and a positive brand image, which will develop customers' confidence in the brand in question (Hyman et al., 2010). However, the diversity does not mean an all-inclusive, unselected product series across excessive categories. One critical determinant of a private label's success on the retailer's side is choosing the appropriate product category with the highest potential (Hoch and Banerji, 1993). Since developing private label series requires a substantial investment in business activities, such as packaging, inventory management, store display, promotions and feature advertising, retailers must be extremely cautious when distributing resources to potential product categories of their store brand to cover these fixed costs (Hoch and Banerji, 1993). Hoch and Banerji (1993) suggest retailers avoid "competing head on" with differentiated national brand manufacturers. This proposition is supported by Hyman et al. (2010), who also advocate investment in product categories with high variety, high margin, high PLB share, and low risk.

### 2.6.3 Interaction between retailers and manufacturers

Though the private label is gaining market share from the national brand, the interactions between retailers and manufacturers do not always have to be

competitive. The development of private label products can be beneficial to both parties. Regardless of the value proposition of a private label product series, both low-end and high-end private labels can always improve channel efficiency (Chen et al., 2009). Chen et al. (2010) further illustrate that both national brand producers and retailers can benefit from adopting private labels, and that end consumers can enjoy lower prices if supply chain participants can vertically integrate the supply of private labels.

Furthermore, supplier selection activities closely link retailers and manufacturers. Ever-enriching private label portfolios aim to deliver varied value propositions, requiring retailers to make tailored business strategies regarding different PL products in their portfolio. Selection takes place when retailers aim to satisfy different customer segments and maintain margins. Kumar et al. (2010) point out that when the quality sensitive customer segment is larger than the price sensitive customer segment, or when the retailer does not expect a particularly high margin from private label product sales, the retailer would have national brand manufacturers supply private labels. Ter Braak et al. (2013) compare the identities of dual branders and dedicated suppliers as private label suppliers, as well as different tiers in the PL portfolio. As economy PLs result in low margins, which are reduced further by stock-keeping, retailers tend to acquire PL supply through multi-sourcing. Premium PL products generate higher margin and are often produced by national brand suppliers. In some cases, the selection is mutual. The rationale for choosing non-leading manufacturers for private labels production is explained by Gómez and Benito (2008): the risks of being a private label manufacturer include low profitability, cannibalisation and unguaranteed distributor loyalty, while the benefits of producing private labels include lower unit production costs, reduced PL production among competitors, and cooperation with retailers. For leading manufacturers the risks outweigh the benefits, while non-leading small- to medium-sized firms are more motivated to seek cooperation and avoid competition. Such findings are generalisable across product categories.

As has been discussed in previous sections, the interactions between retailers and manufacturers form a delicate balance of cooperation and competition. The inroads by private labels in current markets have initiated a battle between retailers and manufacturers. The traditional collaboration between both parties is transitioning to a more complicate, delicate balance of collaboration and competition. The competitive interaction has spread from traditional offline markets to online market due to the increasing importance of private labels in the present market (Arce-Urriza and Cebollada, 2012). Thus, understanding such interactions has become urgent.

One prevailing factor of competition is the production of substitutes. Based on the prevailing idea that competition involves the production of substitutes, Venturini (2006) describes vertical competition as the "competition between retailers' store brands (or private labels) and manufacturers' brands". Steiner (2008) adds variants to this idea, proposing that when two parties are competitors, they compete for sales, margins, and market shares. Corbett and Karmarkar (2001) develop a model that involves four of Porter's (1980) five forces for analysing entry decisions and post-entry competition in multitier supply chains. This model uses the number of entrants at each level of a supply chain to derive the expressions of prices and quantities under deterministic linear inverse demand. This study is later developed in many follow-up studies on supply chain competition. Adida and De Miguel (2011) extend the model of Corbett and Karmarkar (2001) by capturing demand uncertainty and product and retailer differentiation. This study also points out that the intensity of competition among retailers can be reduced by the introduction of asymmetric product assortment. Therefore, it is reasonable to infer that when the substitution level is higher between two products from different retailers respectively, the level of competition rises.

Corbett and Karmarkar's (2001) model involves only one level of horizontal competition. Having realized this limitation, Ha and Tong (2008) build a model of two competing supply chains with a focus on information sharing investment. This study

provides equilibrium information sharing decisions under different investment costs and suggests to invest when both conditions of positive information sharing value and low investment costs are fulfilled. Besides competition among supply chains, in a two-tier supply chain model, competition between private labels and national brands mainly takes on two perspectives: changing purchasing behaviour among customers and bargaining with manufacturers.

In the extant literature, many researchers have identified the significant effect of private label share/consumption on consumers' behavioural store loyalty (Ailawadi et al., 2008, Martos-Partal and González-Benito, 2011, González-Benito and Martos-Partal, 2012, Koschate-Fischer et al., 2014, as cited by Gendel-Guterman and Levy, 2017). However, this effect is inverted with a threshold where the relationship turns from positive to negative (Martos-Partal and González-Benito, 2011, González-Benito and Martos-Partal, 2012). This finding corresponds with Hyman et al. (2010), who advocate a good balance of private labels and national brands. Moreover, the relationship between PL share and customers' store loyalty in both value chains and service chains is examined by Ailawadi et al. (2008); the U-shaped relationship exists in service chains, while in value chains the relationship between PL share and store loyalty is positive and nonlinear.

It is no more accurate to see private labels as cheaper, unbranded alternatives to national brands. Cuneo et al. (2012) have found proof that private labels have established brand equity and that such equity differs in varied product lines. Nies and Natter (2012) point out that higher PL quality enhances store image perception and affects consumers' decisions regarding where to purchase. Sloot and Verhoef (2008) have also determined that consumers' store loyalty is higher than their brand loyalty, indicating that sometimes consumers will settle for something else when their preferred products are not available in the store they visit regularly. They also point out that consumers are more loyal to national brands than to store brands, and that they only switch store when the delisted product is high in market share and

maintains a high hedonic level. This means that, unless they are leading manufacturers, manufacturers are more likely to be the weaker part in the business.

Besides keeping customers inside the store, retailers affect customers' purchasing decision through manipulation of shelf space and promotional material. It remains in the retailer's power to arrange private labels and national brand products displayed on shelves, aisles and tills for everyday sales and promotional activities (Steiner, 2004). According to Dreze et al. (1994), "a couple of facings at eye level did more for the product than five facings on the bottom shelf" (Steiner, 2004). For more private label sales, private label products can be placed at eye level, while national brands might be left on the bottom row. Alternatively, these two product types can be placed side to side for comparison. The image of private labels relies on the price and quality of the national brand products displayed aside, the high quality of which would enhance the PLs' ratings (Ailawadi and Keller, 2004). Furthermore, lower prices trigger greater positive emotions that lead to greater purchase intent and affirmative purchase decisions (Somervuori and Ravaja, 2013).

Other than gaining customers from national brands, the competition between private label and national brands is also reflected by the change of bargaining power between retailers and manufacturers. Bargaining power mainly results from the power to delist and to imitate national brand products. In order to compete and gain more bargaining power, retailers, especially those in the food retailing industry, sometimes delist or sometimes threaten to delist their manufacturers' national brands if their demands are not satisfied (Sloot and Verhoef, 2008). Imitating provides a retailer more leverage against its manufacturers (Morton and Zettelmeyer, 2004). Meza and Sudhir (2010) have further identified the increase in retailers' bargaining power against manufacturers for both imitated and non-imitated products in both mass and niche segments, stating that the increase in bargaining power for imitated products is observed to be higher. From the above, private labels enable retailers to get better supply terms, including lower wholesale prices (Narasimhan and Wilcox, 1998,

Ailawadi and Keller, 2004) and better trade deals (Lal, 1990), through negotiations with manufacturers (Meza and Sudhir, 2010). The benefit of wholesale price concessions is longer lasting and will remain in effect for more than a year after the launch of the private label (Meza and Sudhir, 2010). Furthermore, price concessions obtained from manufacturers also make the retailer more competitive horizontally because the wholesale price might be higher for other competing and less threatening retailers (Steiner, 2004).

## 2.7 The newsvendor model and biased decision making

In this study, performance is measured by a revised version of the newsvendor model. This section introduces the newsvendor model as a tool for inventory management, as well as the biases inherent in human decision making in this model. The latter part of this section focuses on the influence of human cognitive abilities on decision making and performance in this model.

### 2.7.1 The newsvendor problem

The newsvendor model is a classical model of inventory management in the area of supply chain management. This model initially got its name from a scenario where a newsvendor decides how many copies of a newspaper he/she should order to avoid a loss. The demand for the newspaper is random. Overstocking or understocking would lead to a loss. Unsold copies are either worthless or disposed at a price lower than the unit purchasing price, while too few copies leads to an inability to fulfil demand and loses potential sales. This basic model of inventory management is applicable to decision making in a number of fields, including the fashion and sports goods industries at both the manufacturing and retailing levels (Gallego and Moon, 1993). The model has a rich history that can be dated back to 1888, when the economist Edgeworth (1888) employed it to investigate a bank cash flow problem. However, it was not until the 1950s that the newsvendor problem was seriously and extensively studies by academic researchers (Petruzzi and Dada, 1999).

Stemming from the basic simple "newsvendor" scenario, the newsvendor model aims to derive the ordering quantity that can maximise expected profit at the presence of random demand. The order is placed at the beginning of a selling period, while the excessive quantity is disposed at the end. The optimal solution offers an ordering quantity to balance the cost of overstocking and potential foregone sales. Benzion et al., (2008) provide a detailed explanation of the calculations in the newsvendor model. Assume the purchasing price (cost) of one unit is C and the selling price per unit is P, then the marginal profit equals P-C. The salvage value is s, meaning marginal loss equals C-s. The ordering quantity is Q, the demand is D, and the expected profit is $\pi(Q)$. When the placed order (Q) is the optimal solution ($Q^*$), $\pi(Q)$ reaches its maximum value. Given an order size of Q, the expected profit can be calculated using the following equations (Benzion et al., 2008):

(a) $\pi(Q) = ( P - C ) Q$, if the demand is higher than the ordering quantity ($Q < D$);

(b) $\pi(Q) = ( P – C ) D – ( C – s ) ( Q – D )$, if the demand is lower than the ordering quantity ( $Q > D$ ).

Since demand is random, information regarding distributions and demand is very limited in many cases (Gallego and Moon, 1993). Therefore, decision makers are inclined to make an educated guess of the mean and the variance based on normal distribution, which cannot be valid in the presence of other distributions with the same mean and the same variance (Gallego and Moon, 1993). Due to significant uncertainties, for example, the lack of an accurate, stable source of demand information, suppliers' pricing policies, obscure multi-item policies, and an absence of estimation with all-time validity, a number of extensions of the newsvendor model are being developed and studied. In a classical basic newsvendor model, 11 types of extensions are identified (Khouja, 1999):

1. Extensions to different objectives and utility functions.
2. Extensions to different supplier pricing policies.
3. Extensions to different newsvendor pricing policies and discounting structures.

4. Extensions to random yields.
5. Extensions to different states of information about demand.
6. Extensions to constrained multi-products.
7. Extensions to multi-products with substitution.
8. Extensions to multi-echelon systems.
9. Extensions to multi-location models.
10. Extensions to models with more than one period to prepare for the selling season.
11. Other extensions.

These extensions are not exclusive to others as a complicated model is likely to include multiple extensions to match its reflection in real-life situations (Khouja, 1999). As comprehensive as it might be, the newsvendor model is not immune to human decision making biases.

### 2.7.2 Decision making biases in the newsvendor problem

This model offers a simple and elegant solution to maximise the expected profit by calculating the critical fractile, which can be easily derived as follows: Cu stands for underage cost, which equals to P – C, and Co represents the overage cost, which equals C – s. Schweitzer and Cachon (2000) use the critical fractile to differentiate high-profit products and low-profit products. Books and fashion apparel can be classified as typical high-profit products, with CF≥ 0.5. In contrast, low-profit products have low salvage value and low margin, such as computers with CF < 0.5 (Schweitzer and Cachon, 2000).

$$CF = \frac{Cu}{Co + Cu} = \frac{P - C}{P - s}$$

As has been observed in multiple studies, the actual ordering quantities placed by decision makers always systematically differ from optimal quantities (Choi and Kim, 2008, Bolton et al., 2012, Bolton and Katok, 2008). This phenomenon is evident in both experimental and industrial environments (Fisher et al., 1994, Moritz et al., 2013). This deviation is reflected by different ordering patterns among the decision makers, for example, the pull-to-centre effect and demand chasing behaviour.

Schweitzer and Cachon (2000) conducted two laboratory experiments to investigate

ordering decisions in the newsvendor model under different profit conditions of high-profit and low-profit products. Ordering quantities in these experiments were observed to systematically deviate from optimal orders that maximize the profit. Order quantities are observed to be higher than optimal quantity for high-profit products, and lower than optimal quantity for low-profit products. Schweitzer and Cachon (2000) have specified two explanations for this phenomenon. One is the tendency embedded in one's utility function to reduce ex-post inventory error. This preference stems from the decision maker's regret about not having chosen the ex-post optimal ordering quantity. The other explanation is anchoring and insufficient adjustment bias, which indicates an individual tendency to choose an "anchor" and to adjust towards or away from this anchor to an insufficient extent. The mean anchor heuristic refers to an individual's tendency to anchor on mean demand and to adjust towards the optimal ordering quantity (Schweitzer and Cachon, 2000). This cognitive error is significant at the individual level (Kremer et al., 2010). Besides incorporating high-margin and low-margin products, Benzion et al. (2008) extend our understanding of optimal decision making in the newsvendor model by exploring this model under both uniform and normal distributions of demand. In both experimental settings, they have observed ordering quantity deviating from the optimal solution and converging to a value between the mean demand and the quantity that would maximise profits. Following the study of Schweitzer and Cachon (2000) on deviation from optimal decision and its causes as well as its rationale, Bolton and Katok (2008) have extended the experiment to 100 decision rounds and determined that the extended experience can improve newsvendor performance. Bostian et al. (2008) have replicated the experiment in an adaptive learning laboratory experiment environment to clarify the difference in individual decision making behaviour. Each decision made by a subject contains information and counts as a learning opportunity. The results present a faster reduction in bias when decisions are made more frequently.

Loch and Wu (2007) categorise the causes to human behaviour that deviate from

normative prediction into three dimensions, including individual decision making biases caused by their limitations in cognitive abilities, behaviour driven by social preferences, and the impacts of embedded culture on collective thoughts and behaviour. This approach is adopted by Sharma and Nandi (2018) to conceptualise human decision bias in the context of the newsvendor problem from the aspects of individual decision making bias, social preferences and culture.

Most of the studies investigating individual heuristics have focused on individual decision making bias, including the 12 types of bias reviewed by Sharma and Nandi (2018). Based on behavioural theory embedded in the biases, Sharma and Nandi (2018) have identified four themes within this branch of studies: risk aversion, loss aversion and reference dependence (prospect theory), bounded rationality, and overconfidence. The first theme is risk aversion, which is usually applied as an alternative choice model to illustrate the evidence if subjects fail to determine to the risk-neutral expected optimal ordering quantity (Sharma and Nandi, 2018). Studies classified in this theme feature ordering behaviour under risk-aversion in the newsvendor model. Sharma and Nandi (2018) notice that studies in this theme have been extended to a more complicated context, which contains subjects of different genders (De Vericourt et al., 2013), multiple selling periods, and multiple products (Choi and Ruszczyński, 2011). The second theme is loss aversion and reference dependence (prospect theory). Loss aversion stems from prospect theory, which proposes that the disutility caused by a certain size of loss is greater than the positive utility resulting from the same size of gain. Based on this theory, Sharma and Nandi (2018) conclude that loss-averse people prefer to avoid loss in comparison to acquiring gains. Previous studies, as have been identified by Sharma and Nandi (2018), primarily cover the manipulation of the reference point and extensions of prospect theory. The third theme, bounded rationality, depicts missing the optimal solution as a result of information insufficiency, time scarcity and human cognitive limitations (Sharma and Nandi, 2018). A typical example is Su (2008), who highlights the inherent imperfection of human decision making by applying the bounded rationality model

to explain the abandonment of the optimal solution due to the occurrence of random errors in ordering. Finally, about one third of the observed ordering mistakes are caused by overconfidence, or overprecision, in the estimation of order variation (Ren and Croson, 2013). Ren and Croson (2013) have also determined that overprecision is immune to learning or any other dynamic considerations, and would cause a pull-to-centre effect as well.

Compared to studies on the individual decision making bias, only a limited number of studies that focus on the ordering behaviour affected by social interactions are identified by Sharma and Nandi (2018). This branch of study mainly focuses on the impacts on ordering decisions in the newsvendor model imposed by fairness concerns for better performance (Wu and Niederhoff, 2014), behaviour of groups (Gavirneni and Xia, 2009), and social comparison of ordering decisions among peer buyers (Avcı et al., 2014). The investigation into the cultural impacts on inventory decisions, according to Sharma and Nandi (2018), is underexploited and limited to the different ordering behaviours of Chinese and American subjects. Feng et al. (2011) replicated the experimental settings of Bolton and Katok (2008) and discovered that Chinese subjects, with the “doctrine of the mean philosophy” in mind, display a greater possibility of ”pull-to-center” effect on mean demand than Americans do. Furthermore, Cui et al. (2013) found that Chinese subjects outperform American subjects in terms of profitability, and that Chinese subjects tend to order more due to their emphasis on salvage value.

### 2.7.3 Cognitive reflection in the newsvendor model

As has been discussed by Sharma and Nandi (2018), the deviation of actual ordering quantity from the optimal solution in the newsvendor problem can be largely attributed to individual decision making bias resulting from cognitive limitations. Cognitive reflection is a concept which originates from Dual Process Theory, which is derived from cognitive science and has been applied to understand decision making processes in many types of research (Moritz, 2009, Bolton et al., 2012, Moritz et al.,

2013). This theory acknowledges the two simultaneously functioning cognitive processes/systems in human decision making, regardless of vast disagreement on terminology and details (Moritz et al., 2013, Stanovich and West, 2000). For example, the use of the terminology "System 1" and "System 2" has been discouraged in the following studies (see Evans (2010) and Stanovich et al. (2011) for details). Evans and Stanovich (2013) advocate the terminology of Type 1 and 2, representing the distinct dissimilarity between intuition and reflection. We stick to Stanovich and West (2000), who labelled these two cognitive processes as System 1 and System 2 to avoid confusion. System 1 is intuition-based. Habits play a major role in forming this process, which involves fast, intuitive, heuristic-based operations. It demands low cognitive capability and makes rapid reactions to situations. On the contrary, System 2 is rule-based. It has slower, more flexible, conscious, effortful and rule-governed operations that are deliberately controlled. System 1 provides "impressions, intuitions, intentions and feelings" as a solution, while System 2 monitors this answer before correcting, overriding or approving it (Kahneman, 2011).

Stanovich and West (2000) refer to this decision making process as cognitive reflection, meaning an individual's "tendency to let System 2 process moderate, override, or endorse an initial System 1 response" (Moritz et al., 2013). It represents the ability to replace intuitive errors with more deliberative thought (Frederick, 2005). The Cognitive Reflection Test (CRT), proposed by Frederick (2005), is a performance-based, three-item measure to assess an individual's tendency to override intuitive, usually incorrect responses through analytical and reflective thinking. The test contains the following three questions:

*1. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents.*

*2. If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes.*

*3. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it*

*takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days.*

Each question in this measure inherits an impulsive incorrect answer that needs to be suppressed (Frederick, 2005). Erroneous answers can be avoided by calculation, instead of intuition. The total number of correct responses is regarded as one's CRT score, ranging from 0 to 3. Individuals varying in CRT scores have different abilities to spot and correct erroneous intuitions.

Though optimal order quantity can be easily calculated in newsvendor problems, actual order quantities placed by decision makers appear to be different from optimal solutions (Choi and Kim, 2008, Bolton et al., 2012). Performance can be measured by deviations from optimal quantity. The default/intuitive response generated by Type 1 would deviate from a reasonable ordering quantity. When taking perceived threat/competition and opportunistic actions into consideration, Type 2 would modify and override the default decision. It is worth mentioning that concerns do not mean the onset of opportunistic behaviour.

Moritz et al. (2013) are among the pioneers who have used theories in cognitive psychology to obtain a better understanding of heterogeneity, also known as individual differences in the ordering behaviour in the newsvendor model. They ascertained that individuals with higher cognitive reflection are less likely to chase demand, and that in comparison to college major, experience and managerial position, cognitive reflection is a better predictor of performance in terms of average expected profit, average order quantity and order quantity variance. Moritz et al. (2014) also analysed the role of cognitive deliberation, which is measured by CRT, in the context of judgmental time-series forecasting. People with higher abilities to balance intuition and cognitive deliberation are more likely to avoid forecast errors. One of the highlights of this research is that the conclusion stands after controlling for intelligence. This finding echoes previous studies in psychology which have found that even though cognitive reflection is closely related to intelligence (Frederick,

2005), it can predict a number of heuristics and biases (including syllogistic reasoning, inhibition, superstitious thinking), and that cognitive reflection can explain substantial variance that is independent of intelligence (Toplak et al., 2011). Unlike previous papers focusing on decision making in a single tier in supply chains, Narayanan and Moritz (2015) applied this concept to the bullwhip effect in a four-stage serial supply chain. In this setting, operational and environmental causes of the bullwhip effect are mitigated. Performance varies according to the participants' cognitive reflection profiles, in terms of on-order inventory, total costs and order variance (Narayanan and Moritz, 2015).

## 2.8 Chapter summary

This chapter has examined the relevant literature on the key elements involved in this study, including social capital theory, private labels in supply chains, and decision making behaviour and bias in the newsvendor model. The review of the theories allows the establishment of the conceptual models and the related hypotheses to be empirically tested. The following chapter will introduce the conceptual model in detail with proper justification and adequate support.

# CHAPTER 3 HYPOTHESES DEVELOPMENT

## 3.1 Introduction

Following the literature review in the previous chapter, this chapter proposes the relationships embedded within the context of this study. This conceptual model first examines the social capital's influences over retailers' trustworthiness under different levels of product substitution between private labels and national brands before exploring the influences of a retailer's trustworthiness on the manufacturer's performance. Section 3.2 first introduces this conceptual model and then explains the hypotheses in detail.

## 3.2 Theoretical framework

A theoretical framework of a study can be considered as a brief storyline that connects all the key elements of a story. The manufacturer's perception of the retailer's trustworthiness is largely affected by the level of social capital between them. When the retailer introduces a private label that is likely to replace the national brand, the dynamics between the manufacturer and the retailers transform from pure cooperation into a mix of cooperation and competition. Manufacturer' perceptions are likely to change due to the potential business threat. This would possibly lead to changings in business decision making. The extent to which a manufacturer's performance changes is a result of the decision maker's judgement and ability to process relevant information; thus, cognitive reflection is introduced to explain the individual differences in performance. A conceptual framework is established to reflect the theme of this research context.

The review of relevant literature in the previous sections provides insights into some of the critical elements of the background story. Within the scope of supply chain management, Autry and Griffis (2008) explain the use of social capital theory in the influences of structural and relational linkages on firm execution from two

perspectives: relationships and resources. In light of relationships, companies embedded in supply chains are interconnected with other organisations. Each of these companies has different levels of "relational closeness" to its business partners (Autry and Griffis, 2008). Furthermore, social capital theory is relevant in the context of this research as the "theoretical lens" due to its focus on the social, behavioural characteristics of a relationship between two participants/organisations (Villena et al., 2011, Adler and Kwon, 2002, Son et al., 2016). From the perspective of resources, Autry and Griffis (2008) argue that the relevance between social capital theory and supply chain management stems from the transitive resource exchange perspective; they further highlight the role of resource exchange concept in exploration of organisational relationships from the perspective of supply chain management. Since information is a valuable resource that flows along the relationships in a social network, it is reasonable to apply social capital theory to the studies related to information sharing in supply chains. Three dimensions, as proposed by Nahapiet and Ghoshal (1998), enhance trustworthiness and suppress concerns of opportunism in their respective ways at the same time.

As has been discussed in Chapter Two, social capital is a double-edged sword. It describes a relationship where both benefits and risks exist at the same time. Although social capital is likely to induce undesirable behaviour (Granovetter, 1985, Villena et al., 2011, Ayios et al., 2014), the "dark side" of social capital does not necessarily offset the perceptional trustworthiness of one's business partners. Some of the drawbacks of social capital are generated through goodwill. For example, excessive information sharing that exceeds an individual's processing capabilities causes an unnecessary cognitive burden and distraction (Koka and Prescott, 2002). Redundant cognitive capital may lead to loss in objectivity and creativity (Locke et al., 1999, Adler and Kwon, 2002), parochialism and inertia (Gargiulo and Benassi, 1999). Furthermore, frequent social interactions to maintain friendships are likely to distract from critical activities caused by excessive interactions (McFadyen and Cannella, 2004). These activities are conducted for the other's benefit out of goodwill, and are

perceived to be benevolent, but end up with the opposite effect. Therefore, a company can still be considered trustworthy by its trading partner if these activities cause undesirable outcomes.

On the other hand, other drawbacks are created out of opportunism, which can be suppressed by social capital. Since social capital is a resource that can be selected and manipulated by actors, it can result in significant inequalities and perverse outcomes, malfeasance and conflict (Ayios et al., 2014, Granovetter, 1985). The three dimensions of social capital suppress opportunism in their respective ways. In light of structural capital, social embeddedness limits opportunism through word-of-mouth because reputation travels along social networks. If one company is perceived to be untrustworthy, this impression will travel along the connections in social networks and reach indirect contacts who may also be potential trading partners in the future. Relational capital removes doubt about the integrity of others by encouraging cooperative behaviour, decreasing uncertainty and increasing exposure to resources (Villena et al., 2011). It also reduces the necessity for formal contracts (Adler and Kwon, 2002) and regulates one's behaviour more effectively when contracts and agreements are ambiguous (Fey and Birkinshaw, 2005). Through formulating shared business objectives and visions, cognitive capital suppresses inter-firm rivalry, which is "a misalignment of motives and behaviours among allying partners" (Park and Ungson, 2001). This process constrains undesirable actions and suppresses the likelihood of opportunism (Ouchi, 1980, Coleman, 1988, Villena et al., 2011) because damage to one party's benefits would be collateral to those of the other.

Other than suppressing opportunism, social capital enhances perceptional trustworthiness directly along three dimensions. Structural and relational value can be obtained from both direct contacts and indirect connections through "relational conduits" enabled by direct associates (Borgatti and Foster, 2003). Structural capital depicts the pattern of connections between actors (Nahapiet and Ghoshal, 1998) which determines the access to resources and information flows (Son et al., 2016).

Burt (1992) describes it as “who you reach and how you reach them”. Thus, it provides channels for resource exchange realised through social interactions in social networks. Networks support the infrastructure for access to resources, which are derived from the accumulation and cultivation of social capital. Like individuals acting in a social network, companies have access to goods, knowledge, and services by leveraging their networks (Autry and Griffis, 2008). The embeddedness in a large social network facilitates provides direct and indirect access to contacts, as well as sources of resources. Through embeddedness in social networks, structural capital empowers the exchange of timely, relevant, and “fine-grained” information from wider sources among network actors (Uzzi, 1997, Adler and Kwon, 2002). Information of high quality can be relied on to make important decisions regarding one’s management of business activities. Thus, information sharing, as a major carrier of communication between suppliers and buyers, contributes considerably to one’s judgement of the other’s trustworthiness in terms of competence, information quality assurance, and interactional courtesy.

Besides its direct enhancement of trustworthiness, structural capital exerts its indirect impacts on inter-organisational communications by empowering the other two dimensions of social capital (Li et al., 2014). Relational capital depicts the direct ties between actors and the relational outcomes of social interactions in social networks (Inkpen and Tsang, 2005). It involves the trust, obligations, respect, and friendships that have been developed with others through a history of repeated interactions (Nahapiet and Ghoshal, 1998). It also influences actors’ behaviour and motivations to strengthen social relationships by enacting trust, obligation and reciprocity (Nahapiet and Ghoshal, 1998). Regarded as the antecedent to effective information sharing (Wu et al., 2014, Cai et al., 2010), it facilitates smooth information flow and encourages open communications with business partners (Ebrahim-Khanjari et al., 2012, Cheng et al., 2008, Liao et al., 2011). More specifically, Cheng et al. (2008) consider it to be the “pivot” factor that empowers inter-organisational information exchange. Open communication with higher levels of transparency is viewed as a

recognition and appreciation of contributions made by one's business partner (Kwon and Suh, 2005). Therefore, it is reasonable to argue that relational capital, which provides open communication, recognition, and reciprocity, can greatly enhance perceptional trustworthiness, especially in terms of information quality assurance, and interactional courtesy, benevolence and integrity.

The cognitive dimension of social capital provides shared codes, language, and narratives among parties, as well as shared business visions and common business objectives (Nahapiet and Ghoshal, 1998a). It contributes to a deeper understanding of their interaction patterns, behaviour norms and commitment to achieve the collective interest. Cognitive capital is often conceptualised as common values and a shared vision (Tsai and Ghoshal, 1998), and shared culture and congruent goals (Inkpen and Tsang, 2005). As one of the most valuable resources flowing along the social connections in social networks, information shared by companies which have congruent goals is tailored to suit such goals. With similar business goals and associated benefits, one is less likely to take advantage of his or her trading partners by manipulating distorted information because damage to one's benefits would be collateral to those of the other. Furthermore, information quality is perceived to be higher when two parties have collective goals (Li et al., 2006). Thus, a trading partner with whom one company builds high cognitive capital is considered to be trustworthy because the information from this partner is considered to have good quality and suitability.

Based on the discussion above, social capital will improve one's perceptional trustworthiness directly by generating multiple sources of benefits. Although there might be occasions for opportunistic behaviour, it is either conducted with good intention or limited by certain control, which also indirectly enhances perceptional trustworthiness. Thus, it is reasonable to propose:

**Hypothesis 1:** Social capital, in terms of relational (a), cognitive (b), and structural (c) capital, is positively associated with the manufacturer's perception of the retailer's

trustworthiness.

Private labels, also known as store brands, are products or services which are manufactured, provided, and promoted under the name of a specific retailer. They are the opposite of national brands, which are produced and distributed nationwide under the name of a specific manufacturer or distributor. Potentially, there are many other factors that would affect a firm's perception of its business partner's trustworthiness. In this case, competition and the imbalance of power can be viewed as the source of untrustworthiness.

The introduction of private label products has transformed the simple buyer-supplier cooperation into a mix of horizontal and vertical competition (Dobson and Chakraborty, 2015). In the vertical sense, the retailer competes with the national brand product manufacturer for profits as a customer. Horizontally, the retailer also competes with its national brand manufacturer so that it store brands could reach a wider audience and gain more market share than the manufacturer's national brand products. Competition between private labels and national brands can be represented in multiple ways, such as imitation of national brands, shelf space allocation, price wars, and promotions. Retailers sometimes delist or threaten to delist their manufacturers' national brands if their demands are not satisfied (Sloot and Verhoef, 2008). Meza and Sudhir (2010) have identified the increase in retailers' bargaining power against manufacturers for both imitated and non-imitated products, stating that the increased bargaining power for imitated products is observed to be higher.

The imbalance of power between the national brand manufacturer and the retailer with private labels also leads to low perceptional trustworthiness, intensifying the competition between the two in a supply chain. For traditional manufacturers, the role of the retailer is considered as a "gatekeeper" (Ezrachi and Ahuja, 2015). Retailers benefit from controlling the way in which national brand products are exposed to the consumers. Through manipulation of pricing, promotion, and shelf space, etc.,

retailers subtly shift consumers' preferences, even if these consumers have high brand loyalty to a certain brand. Retailers also benefit from loyalty to a certain national brand because higher brand loyalty creates greater opportunities for the retailer to segment the consumers and imitate the national brand (Dobson and Chakraborty, 2015). Consequently, the strategies of delisting and imitation have enabled retailers who have developed private label product lines to gain tremendous bargaining power. Therefore, it is reasonable to use the level of product substitution between private labels and national brands to represent the competition between the two types of products in this study. When two products are perfect substitutes, though a customer may have a preference for a specific product, he or she is willing to buy an alternate product when the preferred product is out of stock (Ganesh et al., 2014). Similarly, the unwillingness of a customer to switch under such circumstance indicates zero degrees of substitution between private label and national brand products. Different levels of product substitution indicate different levels of competition intensity, and thus have different influences over perceptional trustworthiness during business conflicts. For example, when private label products and national brand products are not substitutable at all, the intensity of competition is considered to be the lowest in the context of this study, and so is the dissimilarity between the business goals of the supplier and the buyer. Thus, this study proposes that:

**Hypothesis 2:** Product substitution weakens the associations between social capital and manufacturers' perceptions of retailers' trustworthiness.

**Hypothesis 3:** Different levels of product substitution will have impacts on the changes in manufacturers' perceptions of retailers' trustworthiness.

Within the scope of this study, the manufacturer's performance is examined in the newsvendor model. In this model, a manufacturer makes a production decision that maximises profits based on multiple sources of information, including cost, price and demand information. Although the optimal inventory level can be calculated easily

the actual ordering quantities put by decision makers always systematically deviate from optimal quantities (Choi and Kim, 2008, Bolton et al., 2012, Bolton and Katok, 2008), which is evident in both experimental and industrial environment settings (Fisher et al., 1994, Moritz et al., 2013).

Manufacturers use demand forecasts from retailers to make their decisions. If the manufacturer perceives the retailer to be trustworthy, he or she would assume that the retailer is sharing information out of good intentions and would interpret this behaviour in a more positive manner (Uzzi, 1997). However, perceptional trustworthiness is a judgement based on the history and current state of a relationship. It is not immune to judgemental errors. It does not equal to actual integrity. A false impression of a retailer's trustworthiness would cause unnecessary overstock or shortage. When the retailer introduces a private label product series that will replace the national brand products, the tension between both parties is likely to influence this judgement; as a result, a decision maker will generate a solution that is likely to improve or impede the performance. A correct judgment of the creditability and trustworthiness of a retailer can boost performance, while a false judgement can cause significant losses. Therefore, it is reasonable to propose:

**Hypothesis 4 (a):** The manufacturer's perception of the retailer's trustworthiness is negatively related to his/her performance when the retailer is acting opportunistically.

**Hypothesis 4 (b):** The manufacturer's perception of the retailer's trustworthiness is positively related to his/her performance when the retailer is not acting opportunistically.

**Hypothesis 5:** The manufacturer's perception of the retailer's trustworthiness mediates the relationship between social capital and the manufacturer's performance.

Since perception can be distorted by expectation, desires, beliefs and needs (de Lange et al., 2018, Pronin, 2007), it does not always reflect reality accurately. Perception bias

is the error in an individual's perceptual process, and can be depicted as the gap between reality and perception. Dual Process Theory, often applied in studies in cognitive science and decision making, addresses one intuitive, heuristic-based process/system and one conscious, rule-governed process/system functioning simultaneously in human decision-making (Moritz et al., 2013, Stanovich and West, 2000). Cognitive reflection represents the ability to replace intuitive errors with more deliberative thoughts (Frederick, 2005). Cognitive ability can predict a number of heuristics and biases (including syllogistic reasoning, inhibition, superstitious thinking) (Toplak et al., 2011), which are often observed in decision making in the newsvendor model. Such cognitive errors have been observed to be significant at the individual level (Kremer et al., 2010). According to Moritz et al., (2014), cognitive reflection is a better predictor of task performance than college major, years of experience, and managerial position. People with higher cognitive abilities are better at keeping a balance between intuition and cognitive deliberation and are therefore more likely to avoid forecasting errors (Moritz et al., 2014). Furthermore, in multi-tier supply chains, participants with higher cognitive reflection have greater consideration of on-order inventory, therefore, achieve lower total costs (Narayanan and Moritz, 2015). Based on the consideration above, it is reasonable to view cognitive reflection as a moderator:

**Hypothesis 6:** Cognitive reflection weakens the relationship between the manufacturer's perception bias regarding the retailer's trustworthiness and his/her performance.

# CHAPTER 4 METHODOLOGY

## 4.1 Introduction

This chapter addresses the research methodology employed to test the conceptual framework established in the last chapter in greater detail. Research involves a "systematic and organized effort to investigate a specific problem that needs a solution" (Sekaran and Bougie, 2006). When put in the context of business, research is "a systematic inquiry that provides information to guide managerial decisions", which includes "planning, acquiring, analyzing and disseminating relevant data, information, and insights to decision makers in ways that mobilize the organization to take appropriate actions that, in turn, maximize performance" (Cooper and Schindler, 2014). Similarly, Sekaran and Bougie (2016) define business research as "an organized, systematic, data-based critical, objective, inquiry or investigation into a specific problem, undertaken with the purpose of finding answers or solutions into it". Thus, the approach of a systematic inquiry should be highly valued. Based on this consideration, this study contains a systematic, rigorous methodology to address the research questions proposed in the previous sections.

This investigation aims to shed light on the influence of social capital over manufacturers' perceptions of their retailers' trustworthiness, reflected by information sharing behaviour, and the consequential performance, in the presence of the private label. To achieve this objective, this chapter presents proper justifications to support the employed methodology alongside a detailed explanation of the rationale of the research design and administration. Sections 4.2 and 4.3 introduce the research paradigm, discuss the methodological approach employed in this study, and justify the research strategy. From Section 4.4 onwards, this study presents detailed research administration and proper justifications. Topics to be explored include the experiment design, the data collection protocol, testing and validation of the research instrument.

## 4.2 Research paradigm

In the landmark work *The Structure of Scientific Revolutions, published by* the American philosopher Thomas S. Kuhn (1962), “paradigm” depicts a philosophical way of thinking. Guba and Lincoln (1994) define a paradigm as “a basic set of beliefs or worldview that guides research action or an investigation" (Kivunja and Kuyini, 2017). A research paradigm reveals the researcher’s beliefs about the world and expectations of the world that he/she wishes to live in (Lather, 1986, Kivunja and Kuyini, 2017). It depicts the philosophical orientation of a researcher, and works as a theoretical lens through which the researcher examines both the methods that will be employed and data analysis techniques (Kivunja and Kuyini, 2017). Lincoln and Guba (1985) proposed that multiple research paradigms should be compared from four perspectives: ontology, epistemology, methodology and axiology. The paradigms were later reduced to ontology, epistemology and methodology, and this conceptualisation has become the most widely adopted version for comparing research paradigms in social science research (Morgan, 2007).

### 4.2.1 Epistemology

Epistemology is the combination of two Greek words: “*episteme*”, meaning “knowledge” or “science”, and “*logos*”, meaning “knowledge”, “information”, “theory” or “account” (Johnson and Duberley, 2000). Thus, epistemology concerns the process we acquire knowledge, from the perspectives of its nature, forms, acquisition, and how it can be communicated to other human beings (Kivunja and Kuyini, 2017).(Kivunja and Kuyini, 2017). Divergence in epistemology would result in significant distinctions in the choice of methodology selection and would lead the researcher to different sources of knowledge, which will be discussed in Section 4.2.3.

### 4.2.2 Ontology

Ontology contributes to a better understanding of the things that constitute the world (Scott and Usher, 2004). The term “ontology” consists of two Greek words, “ontos”

and “logos”, with the former meaning “being” and the latter referring to theory or knowledge, etc. (Gill and Johnson, 2010). Gill and Johnson (2010) define ontology as a branch of philosophy concerning the essence of phenomena and the nature of their existence. Ontology conceptualises the form and nature of reality and what a researcher believes can be known about that reality, which is crucial in obtaining a better sense of the collected data. This conceptualisation is critical as it frames the way in which a researcher considers the research problem, its significance, as well as the appropriate approach to reach a solution (Kivunja and Kuyini, 2017).

### 4.2.3 Methodology

The methodology of a paradigm refers to the design of approaches and techniques that are used in an investigation of something (Kivunja and Kuyini, 2017). During the process of research conduction, methodology articulates the logic and flow of the systematic processes, including assumptions made, limitations encountered and how they are mitigated or minimised, to gain knowledge about a research problem (Kivunja and Kuyini, 2017).

Put simply, a research paradigm relates to the nature of reality and truth. It starts with the element of ontology, which not only concentrates on the nature of reality but also connects ontology and epistemology through questions about the possibility of “truth” in the form of “objective knowledge” about that reality (Morgan, 2007). In turn, the assumption of ontology constrains the subsequent epistemological assumptions about the nature of knowledge, which passes the limitations on to the range of methodological assumptions about generating knowledge (Morgan, 2007).

## 4.3 Theoretical perspectives

Of the multiple theoretical perspectives, positivism and various strands of interpretivism are regarded to be among the most influential ones in the area of social science (Gray, 2013). The assumptions articulated by quantitative purists are in line with the positivist paradigm, while those of the qualitative method are quite the

opposite (Tuli, 2010). The differences between positivism and interpretivism can be examined form the perspectives of ontology, epistemology and methodology.

In the 20th century, the dominant research methodology in social science was quantitative methodology. It stemmed from the field of natural science, such as Chemistry, Biology, Geology, etc., and focused on investigations of things that could be observed and measured in some way. This method was not regarded as qualified enough for both conducting research and generating knowledge. Consequently, researchers began to explore an alternative research method to conduct research in social science and developed qualitative methodology, which focuses on reasons for phenomena in the social world and the reasons for people's behaviour (Tuli, 2010).

| Research paradigms | Positivism | Interpretivism |
|---|---|---|
| **Ontology** | Naïve realism – "real" reality but apprehendable | Relativism – local and specific constructed realities |
| **Epistemology** | Dualist/objectivist; findings true | Transactional/subjectivist; created findings |
| **Methodology** | Experimental/manipulative; verification of hypotheses; chiefly quantitative methods | Hermeneutical/dialectical |

*Taken and adapted from Guba and Lincoln (1994)*

**Table 4. 1** Basic beliefs of research paradigms

### 4.3.1 Positivism

Positivism was first proposed by Auguste Comte (1798 - 1857), a French philosopher, who defines a worldview of research that is based on what is known in research methods as the scientific method of investigation (Kivunja and Kuyini, 2017). The core argument of positivism is that the social world exists externally to the researcher and that its properties can be measured directly through observation (Gray, 2013). In light of this argument, as proposed by Gray (2013), positivism stands on the following

grounds:

> *"Reality consists of what is available to the senses – that is, what can be seen, smelt, touched, etc.*
> *Inquiry should be based upon scientific observation (as opposed to philosophical speculation), and therefore on empirical inquiry.*
> *The natural and human sciences share common logical and methodological principles, dealing with facts and not with values."*

Therefore, positivism regards social science as an organised method that embodies a combination of deductive logic and precise empirical observations of individual behaviour to develop a series of probabilistic and generalisable causal laws to predict human activity patterns (Neuman, 2003, Tuli, 2010). Driven by deductive logic, research in this paradigm explains and predicts these patterns through the formulation of hypotheses, testing those hypotheses, and the use of operational definitions and mathematical equations, calculations, extrapolations and expressions to derive conclusions (Kivunja and Kuyini, 2017). Consequently, large-scale surveys and laboratory experiments are adopted as major data collection methods in positivistic studies due to their careful monitoring of data and the repeatability of the results (Johnson and Clark, 2006).

Gray (2013) advocates examining this world from a "post-positivist" point of view, due to the challenges towards the nature and the results of scientific inquiry, and the proposal of a number of alternative theoretical perspectives, or instance the anti-positivist, post-positivist and naturalistic stances. Onwuegbuzie et al. (2009) also encourage modern quantitative researchers to regard themselves as post-positivists due to the fallibility inherent in all observations and the inability to produce a perfect and complete explanation (Gray, 2013). Based on this consideration, post-positivist studies are built on inferential statistics, with their emphasis on assigning probabilities as opposed to certainty, to the observed findings (Gray, 2013).

### 4.3.2 Interpretivism

According to Tuli (2010), both positivist and interpretive researchers build their studies on the common grounds that human behaviour may be patterned and regular. While positivistic researchers use the laws of cause and effect to explain this pattern, interpretive researchers regard these human behaviour patterns as being created out of evolving meaning systems that people generate as they engage in social interactions (Neuman, 2003, Tuli, 2010). Interpretivism is a major anti-positivistic stance which seeks "culturally derived and historically situated interpretations of the social life-world" (Crotty, 1998, Gray, 2013). Thus, this paradigm is interested in the human individual's subjective interpretations of the context. Every effort is made to obtain a better understanding of the opinion of the subject under observation instead of that of the observer (Kivunja and Kuyini, 2017). It therefore aims to explain a specific phenomenon instead of formulating rules by providing repeatable and generalisable results. Research undertaken within the interpretivism paradigm adopts qualitative approaches to collect data, including focus groups, interviews and case studies, which lasts for a period of time

depend on personal contact between the observer and the observee(s) over a period of time. In this sense, maintaining a positive relationship with the research subjects can facilitate deep insights into the research context and add richness and depth to the collected data (Tuli, 2010).

Based on the brief discussion of the two dominant research paradigms above, this study will adopt post-positivism as the main research paradigm. This is because this thesis aims to establish a generalisable probabilistic rule which depicts the impacts of private labels on the relationship between manufacturers and retailers and the consequential performance fluctuation of the manufacturer. Thus, a quantitative approach in line with positivistic logic will be employed to reach a conclusion that will contribute to a better understanding of the private label craze in supply chains. An SBRP experiment will be developed to collect data for further hypotheses testing.

## 4.4 Research method selection and its rationale

A research design is the blueprint of the conduction of a study, providing guidelines for data collection techniques, measurement of variables, and analysis of data. A typical research design should describe the objective of the research, techniques for data collection, the sampling strategy, and how the data will be analysed (Gray, 2013). This study aims to gain an understanding of the influence of social capital over manufacturers' perceptions of their retailers' trustworthiness, reflected by information sharing behaviour and the consequential performance in the presence of the private label. In order to obtain a meaningful conclusion to the research question, it is crucial to use the most appropriate research approach. This section aims to outline the research method applied and to explain the rationale for this method.

This study takes a behavioural economic approach to unveil the relationships the influences of social capital and vertical competition on managers' production decision. The appropriateness of this approach is due to its connections to the context of this thesis. This thesis explores individual decision making at the presence of uncertainty of business partners' credibility, and competition intensiveness, while behavioural economics looks into individual judgement and economic decision-making under uncertainty (NobelPrize.org, n.d.). According to Gradinaru (2014), in the extant literature, behavioural economics is presented as a branch of economy based on a series of assumptions of human behaviour, which reflects discoveries from fields of psychology, social science and biology. It adds knowledge to the understanding of decision making and behaviour by integrating behavioural science with economic principles (Camerer et al., 2004). Unlike neoclassical economics which assumes perfect rationality and applies these assumptions to predictions of economic behaviour, behavioural economics looks into individual psychology, cognitive limitations and behavioural differences that lead to variations in economic decision making (Mullainathan and Thaler, 2000).

Within the area of behavioural economics and psychology, researchers have spotted persistent biases and systematic deviation in individual decision-making from the optimal solution based on assumptions of rationality in neoclassical economics (Kahneman, 2003a, Kahneman, 2003b, Wilson and Dowlatabadi, 2007, Frederiks, Stenner and Hobman, 2015). This is due to mental shortcuts, which aims to solve problems quickly and efficiently in situations high levels of complexity, choice, risk and uncertainty (Kahneman et al., 1982, Gigerenzer and Gaissmaier, 2011, Frederiks, Stenner and Hobman, 2015). Because in most cases, solutions proposed by individuals are not in accordance with optimal policy, behavioural issues including judgment and decision making have been attached with significant importance in exploring and explaining humans' failure in reaching optimal decisions in the context of supply chain management (Bazerman, 2002; Stanovich and West, 1998, as cited by Tokar, 2010).

This research is conducted by collecting primary data. Primary data is the data collected for a specific research problem (Hox and Boeije, 2005). Once collected, new data enriches the extant store of social knowledge. Such enrichment allows reuse by other researchers in the general research community (Hox and Boeije, 2005). Since primary data is collected for a specific research question by the researcher, the researcher is capable of maintaining control over the way primary data is collected and recorded, which makes the data highly compatible to the research context.

Quantitative methods mainly include experimental, quasi-experimental, and non-experimental strategies. As has been introduced in the previous section, a quantitative method with a positivistic logic is adopted in this study. Experimentation is a major primary data collection strategy (Hox and Boeije, 2005). Experiments are studies where the researcher manipulates a certain variable in a setting and observes its influence over the subjects being studied. The researcher observes whether the dependent variable is affected by the manipulation of the independent or explanatory variable as hypothesised (Cooper and Schindler, 2014). When examined

from the perspective of epistemology, experimental studies fall into the category of objectivism and are impacted by positivistic perspectives. Thus, the intention of experimental studies is to produce objective, valid, and replicable results (Gray, 2013). As post-positivism argues that research within this paradigm focuses on the convincing probability, instead of certainty, of a phenomenon, the methodology of experimentation is considered closer to realising this objective than any other primary data collection method (Cooper and Schindler, 2014).

Regardless of the context of the study, there are four basic elements that are considered to be critical to a traditional experimental setting: (1) random selection of subjects; (2) random assignment of subjects to the different treatment conditions; (3) experimenter manipulation of the treatments; and (4) experimenter control over the conduct of the experiment (Bachrach and Bendoly, 2011). Cooper and Schindler (2014) have identified five major benefits of using experimentation in research. The first lies in the control of the researcher over the independent variable, whose change would explain the probability of the changes in the dependent variable. The second advantage is the control over the contamination of extraneous variables, which isolates the experimental variables and helps the researcher observe their impacts more efficiently. The third benefit of experimentation is the convenience and cost of research conduction, which provides the researcher with the requisite flexibility to adjust variables and conditions that evoke extremes not observed under routine circumstances. In the fourth place, experimental settings allow researchers to replicate this design to other people, situations, and times. The fifth advantage is exclusive to field experiments as they can reduce subjects' perceptions of the researcher as a source of intervention or deviation in their everyday lives.

Based on these considerations, experimentation is an appropriate approach to collect data. The rise of studies on behavioural operations has introduced behavioural laboratory experiments, meaning experiments of "human behavior and decision making in relation to what is rational", into the mainstream in the field of supply chain

management (Siemsen, 2011). The behavioural experiment is relevant to judgement and decision making in supply chain research (Knemeyer and Naylor, 2011). Experiments contribute to a better understanding of issues that may be difficult to explore with other approaches, including queries into the unethical behaviours of individuals (Eckerd and Bendoly, 2011). Since this study includes exploration of perceived trustworthiness, which is reflected by individual opportunistic behaviours, and decision making related to inventory management, it is reasonable to adopt a behavioural experiment in this study. To be specific, data collection is completed through an SBRP experiment. The SBRP experimental setting displays one of the varying versions of a vignette (Alexander and Becker, 1978), which is "a short, carefully constructed description of a person, object, or situation, representing a systematic combination of characteristics" (Atzmüller and Steiner, 2010, Aguinis and Bradley, 2014). It accurately conveys information regarding factors of interest and cues human subjects to form certain perceptions that trigger the appropriate reactions, thus the experimental design is highly consequential to the research (Rungtusanatham et al., 2011). Furthermore, the SBRP experiment is more appropriate than traditional experiments in terms of validity. In an experimental setting, researchers may be able to illustrate an extensive level of control over variables and procedures, resulting in the trade-off of external validity (Bachrach and Bendoly, 2011). In an SBRP experimental setting, however, manipulating experimental vignettes can maintain a balance between internal and external validity (Aguinis and Bradley, 2014).

The laboratory experiments take place in a lab, where the experiment subjects react to manipulated conditions. Their reactions are observed, recorded and analysed. However, the attendance of experiment subjects is not easy to control, especially when the researcher aims to reach a specific population that is not usually spotted around the lab. Based on this consideration, this study refers to Mantel et al. (2006) for their use of a mail-survey based experiment, which maintains control over variables and meanwhile overcomes geographical dispersion. A mail-survey based experiment takes the form of an online survey and contains carefully designed

information that fits a specific experimental setting. This method has the advantages of a survey study, such as expanded geographic coverage without increased costs, minimal staff required, access to otherwise inaccessible people, etc., and maintains the rigid control of an experimental study.

## 4.5 Experiment design

### 4.5.1 Overview

Within-subject and between-subject are two major approaches to design an experiment. In an experiment with a within-subject design, researchers compare the change in experimental individuals' behaviour patterns before and after treatments to make causal estimates about the hypothesised relationships. In a between-subject experiment, each individual is exposed to only one specific level of treatment, so that researchers compare the behaviour of subjects in one group with the behaviour of those in another (Charness et al., 2012). This study adopts a combination of both designs, because the treatment is set at three different levels. Whether this treatment is effective, and whether the effectiveness corresponds to different levels of settings should both be tested.

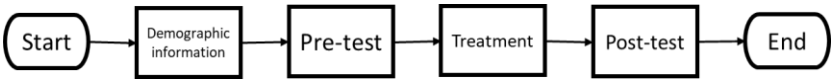


**Figure 4. 1** Experiment flowchart

This study investigates manufacturers' perceptions of their retailers' trustworthiness, reflected by perceived opportunistic behaviour, and the consequential performance under different levels of product substitution. To achieve the research objective, it is crucial to compare subjects' perceptions of the retailer's trustworthiness before and after the introduction of a private label. The extent to which this factor changes such perceptional trustworthiness requires comparison between different groups. Thus, an SBRP experiment in the form of an online survey is designed. Before displaying the experimental vignette, we collect demographic information of the subjects and measure their cognitive reflection using the CRT. There are three major units in the

vignette: pre-test, treatment and post-test (see Figure 4.1). Information about product substitution, which works are the treatment, is only available to the subjects after the pre-test. Pre-test and post-test responses are extracted for comparison to confirm the effectiveness of the treatment; thus, questions in both units are identical. Both pre-test and post-test include two sections: V_SC and V-Ordering. V_SC contains carefully manipulated parameters of social capital, which triggers subjects' perceptions of the retailer's opportunistic behaviour. The subjects then move on to V_Ordering, where they make an ordering decision in a newsvendor model based on their perceptions and information included in this part. The treatment is manipulated into three levels: no, unknown and perfect substitution. Subsequently, perceptions and ordering decisions are collected once again post-test. Some attention checks are included to ensure the quality of collected responses.

The scenarios and questions are fitted into a self-administered questionnaire, which is sent to people with business-to-business (B2B) experience in the USA. A total number of 371 responses are collected, evenly distributed among three groups. To ensure the quality of the collected responses, some attention checks are included to ensure that the participants stay focused and display a good understanding of the materials presented to them.

### 4.5.2 Vignette design

A vignette is defined as "a short, carefully constructed description of a person, object, or situation, representing a systematic combination of characteristics" (Atzmüller and Steiner, 2010, as cited by Aguinis and Bradley, 2014). It accurately conveys information regarding factors of interest and prompts human subjects to form certain perceptions that trigger certain responses and reactions, meaning the design and validation are highly consequential to research (Rungtusanatham et al., 2011). We use the three-stage process of vignette design advocated by Rungtusanatham et al. (2011) to create the vignette in this study. This process contains three stages, namely the Pre-Design stage, the Design stage, and the Post-Design stage.

During the Pre-Design stage, information is gathered in order to clarify both the context of the research question and factors of interest at the measurement level (Rungtusanatham et al., 2011). The researcher is expected to be familiar with the circumstances under which the research question is likely to take place. The familiarity can be obtained through first-hand experience, interviews with expert witnesses who have had relevant experiences of such situations, and exploratory case studies related to the research questions (Rungtusanatham et al., 2011). Based on a solid understanding of the context of the research question, the researcher is able to integrate this understanding and the presentation of the vignette with other salient aspects of the experimental setting that aim to resonate with the human subjects (Fredrickson, 1986, Wason et al., 2002, Rungtusanatham et al., 2011). Besides the context of the research question, the researcher should also be familiar with the factors of interest at the measurement level through existing vignettes and preferably validated measurement instruments. The availability of existing vignettes and measurement scales minimises the investment that the researcher has to make to produce a psychometrically reliable vignette (Wason et al., 2002, Rungtusanatham et al., 2011).

The Design stage, according to Rungtusanatham et al. (2011), is a structured creative writing stage during which the researcher creates multiple versions of the vignette in accordance with varying levels of the factors of interest: the precise number of versions is the function of the number of the actors of interest and the number of levels of each factor of interest. Trentin et al. (2011) suggest the principle of form postponement to divide the vignette into two separate but related modules: one common module and one experimental cues module. The common module of the vignette provides contextual information that remains constant across varying versions of the vignette, while the experimental cues module consists of written statements about the level of the factors of interest, with each version varying to convey specific but different levels of the factors of interest to the human subjects (Rungtusanatham et al., 2011). The separation of the common module and

experimental cues modules is advised to ensure that the manipulated factors of interest are salient to human subjects (Wason et al., 2002). This also boosts the efficiency of the research when generating varying versions of the vignette by enabling the "easily swapping in and out words" (Rungtusanatham et al., 2011).

During the Post-Design stage, the validity of the vignette is checked to ensure clarity, completeness and effectiveness (Rungtusanatham et al., 2011). The completeness of the vignette means the vignette contains all the necessary information for the human subject to understand their role, to react to the situation depicted in the vignette, and to respond to the question embedded in the vignette. The effectiveness of the vignette means that it is able to prompt the human subject to have the exact same level of perception regarding the factors of interest as the vignette intends to convey. To ensure the validity of the vignette, Rungtusanatham et al. (2011) argue that the vignette should be reviewed by a large, diverse panel of individuals who are not necessarily familiar with the research context. After the review, the authors also suggest the launch of a pilot study of the vignette and its varied versions with a sample of human subjects. This pilot study has three major purposes that aim to further validate the vignette. The first is the experimental protocol, which must be assessed to minimise bias introduced by the researcher in the way the human subjects read, react and respond to respective version(s) of the vignette and to ensure that the same protocol is maintained across different waves of experimentation (Rungtusanatham et al., 2011). The second purpose of the pilot study is to identify whether the vignette is sufficiently realistic to simulate the reality to support the role play game for the human subjects. The third purpose of the pilot study is to assess the effectiveness of the manipulation. The researcher should check the degree of correspondence between the levels of the factors of interest supposedly cued in a specific version of the vignette and the levels of these factors perceived by the human subjects (Rungtusanatham et al., 2011). Thus, the mean level of the factors of interest perceived by the human subjects who are cued low levels should be lower than that perceived by the human subjects who are cued high levels.

There are three units (V_SC, treatment and V_Ordering) included in this vignette, which are designed respectively following the three-stage protocol proposed by Rungtusanatham et al. (2011).

V_SC provides information regarding social capital. The majority of social capital measures are established and validated in survey studies, and to our knowledge a very limited number of studies have used experiments to depict social capital. The psychometrically reliable and valid statements in survey studies can be repurposed and merged into vignettes (Wason et al., 2002). Measurement of relational capital in terms of trust is adapted from Villena et al. (2011), while cognitive capital is measured from the perspectives of shared vision, similar business goals and commitment to reach a win-win situation (Villena et al., 2011, Li et al., 2014). Measurement of structural capital is adapted from items from Li et al. (2014), mainly from the aspect of social interactions. In order to make the scenarios more realistic and reasonable, levels of each dimension of social capital are supposed to follow certain correlations. We take coefficients from Li et al. (2014) and transform 1X3 vectors with normally distributed numbers into a final total of 262 different matrices to represent levels of each dimension of social capital through multiplication, sigmoid function and round-up. The generation of the parameters that cue the levels of social capital is explained in Section 4.5.3. During the Design stage, the common module and experimental cues modules are separated. The common module tells a background story, which leads subjects into the role-playing game. The experimental cues modules include information relating to varying levels of social capital. Finally, the validation phase of designing the social capital vignette, two items taken from Li et al. (2014) are retained to indicate the level of cognitive capital after the pre-test and discussion stages.

The second unit of the vignette is the treatment. Product substitution is set as the treatment in the experiment and is manipulated into a 1X3 setting: perfect substitution, no substitution and unknown substitution. The description of the substitution degree is adapted from the definition proposed by Ganesh et al. (2014):

“when products are perfect substitutes, though a customer may have a preference for a specific product, he is willing to buy an alternate product when his preferred product is out of stock”. This definition is then revised to match the No_Substitution and Unknown_Substitution settings, which have proved to be effective in both the pilot study and the later analysis.

V_Ordering is designed in accordance with the new approach to explore economics proposed by Thaler (2016). This approach includes two different two sets of theories in economics-related problem-solving. One includes normative models to depict optimal solutions; the other one includes descriptive models to capture the actual individual decision-making for specific problems. In this part, participants are given a revised newsvendor scenario with crucial data and are expected to make a production decision to supply the demanded product to their retailer. As discussed in Chapter Two, decision bias resulting from various causes has been observed in the newsvendor model. According to Loch and Wu (2007), cognitive limitations, social preferences and cultural factors are the major causes that lead to deviation from the optimal solution. To control the influence of social preferences on decision making in this study, experimental subjects participate in the study independently and anonymously on an online platform. They are also informed that their responses will not be judged as right or wrong. Since all the responses are collected in America, influences of cultural diversity are minimised. Cognitive limitations and distractions caused by cognitive overload would drive individuals to make less effective decisions in the newsvendor model (Feng et al., 2015). In addition, decision bias caused by cognitive burden is controlled by simplifying the newsvendor scenario. Generic information, such as production cost, selling price and salvage cost, is not provided to simplify the description and avoid distraction. Instead, a range of order sizes is given for reference. Orders from the retailer with private label products will be different from its usual orders and out of the suggested range, implying potential competition. It is left to the participants to decide whether such deviation indicates demand fluctuation or misleading information. This part has three underlying assumptions.

Firstly, there are only two brands competing in the local market. Secondly, in order to ensure flexibility and simply the scenario, delivery costs are not considered. Thirdly, demand for this product fluctuates throughout the whole year, with peaks and troughs in different selling periods. This thesis explores the influence of social capital on the perceptional trustworthiness and its consequential performance. Production decisions are viewed as the direct results from perceptional trustworthiness. Therefore, it is reasonable to simplify the newsvendor scenario as described above.

### 4.5.3 The generation of parameters

In order to make the scenarios more realistic and reasonable, levels of social capital are supposed to follow certain patterns. Normally distributed random numbers are generated to form a 1X3 matrix and transformed to represent the levels of structural, relational and cognitive capital, respectively (see Figure 4.2). A coefficient matrix is formed using coefficients taken from Li et al. (2014). Then, 4500 matrices are generated and multiplied by the coefficient matrix, resulting in 4500 matrices each containing three correlated elements. These matrices are then transformed using the sigmoid function, which reflects values into a range from 0 to 1 without changing the correlations. Following this, the results are multiplied by seven and then rounded up, which is in accordance with a 7-point Likert scale. Repetitive results are eliminated, resulting in 262 matrices representing different combinations of social capital.

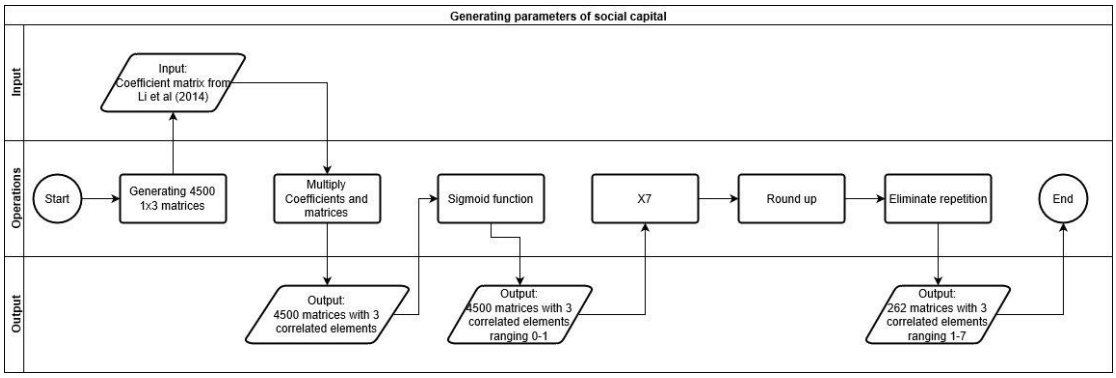


**Figure 4. 2** Generating correlated parameters of social capital

### 4.5.4 Key variables

**Social Capital.** Within the scope of this study, the three separate dimensions of social

capital are the independent variables used to predict the value of the perceived trustworthiness of the retailer. Structural, relational and cognitive capital are directly generated through the procedure explained in the last section. Rungtusanatham et al. (2011) suggest checking the degree of correspondence between cued levels of factors of interest and participants' perceived levels of these factors. However, vignettes cuing social capital are generated randomly and transformed into a number of different versions. The workload would be tremendous if the cued social capital and perceived social capital are compared in pairs. Moreover, perceived social capital is under the combined influences of cued social capital, which may be high in one dimension and low in others. The correspondence of cued social capital and perceived social capital on one dimension does not guarantee the correspondence on other dimensions. Based on this consideration, a new variable which records perceived social capital is collected after the subjects are exposed to the manipulated cued social capital. In this study, perceived social capital is the subjects' impression of the cued social capital, reflected by the subjects' judgment of likelihood of the retailer's opportunistic behaviour.

**Perceptional trustworthiness.** According to Caldwell and Clapham (2003), perceptional trustworthiness incorporates seven duties. Not all are relevant in this context. The retailer is expected to share information of desirable quality in a manner that's previously agreed by both parties. Information shared should not be distorted or manipulated to mislead the receiving party. Therefore, when answering questions regarding perceptions of retailers' trustworthiness, participants specify their perceived likelihood of opportunistic actions from the perspectives of information sufficiency, relevance, timeliness, misleading nature, clarity, and accuracy (see Table 4.2). In the context of this study, when the retailer is considered to be trustworthy, this partner is believed to be less likely to act out of self-interest at the expense of other's benefits. Therefore, it is reasonable to measure perceptional trustworthiness through perceived opportunism. The responses are collected through a 7-point Likert scale, with 1 representing "not likely at all" and 7 representing "very much likely".

Then the responses are reversely coded to stand for trustworthiness. The items adopted to measure opportunistic behaviour related to information sharing activities have been adapted from Hill et al. (2009) and Eckerd and Hill (2012b) in terms of deceitful unethical behaviour, and from Li and Lin (2006) in terms of perceived information quality. This scale is later proved to be reliable.

| Items | To what extent do you think the retailer would…? |
|---|---|
| **OP1** | Share insufficient information intentionally? |
| **OP2** | Share irrelevant information intentionally? |
| **OP3** | Mislead our company intentionally? |
| **OP4** | Delay sharing information intentionally? |
| **OP5** | Share obscure information intentionally to gain competitive advantage? |
| **OP6** | Exaggerate the seriousness of a problem, to gain more information than stated in contracts intentionally? |
| **OP7** | Share insufficient information intentionally? |
| | *OP: opportunism* |

**Table 4. 2** The list of items measuring opportunism/perceptional trustworthiness

**Product substitution.** Product substitution between private label and national brand products is the moderator between social capital and perceived trustworthiness. In SBRP experiments, the correspondence between the cued and perceived degrees of factors of interest should be checked (Rungtusanatham et al., 2011). After the vignette containing levels of social capital is shown to the participants, their perceived level of social capital is recorded and used as a predictor of their perceptions of the retailer's trustworthiness when testing the moderating effects of the private label. As suggested by Rungtusanatham et al. (2011), we compare the cued and perceived levels of social capital to assess the effectiveness of the private label vignette. Since there are three levels of product substitution, participants' responses after this treatment are compared in pairs. The results indicate the effectiveness of this treatment as their responses correspond with the level of product substitution shown

to them.

**Control variables.** Cognitive reflection is the control variable as individuals varying in cognitive abilities would demonstrate a difference in decision making performance in the newsvendor problem. The CRT proposed by Frederick (2005) is used to measure subjects' cognitive ability levels. The total number of correct responses is regarded as one's CRT score, ranging from 0 to 3. Besides cognitive reflection, this study also controls subjects' gender, B2B experience, age, income level and education level.

**Performance.** The manufacturer's performance is the dependent variable in this study. The newsvendor model is used in this section, because it aims to derive the optimal ordering quantity that can maximise expected profit at the presence of random demand. The scenario embedded with the newsvendor model is mathematically and logically realistic. The optimal quantity serves as a reasonable criteria for performance, which is measured by the deviation from the subject's decision to the optimal quantity. Responses are collected in V_Ordering, where participants are asked to make an ordering decision to supply retailers with the demanded products based on the information provided. Information for deriving optimal ordering quantity is presumed. Since the scenario goes that "the first retailer normally orders 1800-2200 units of products", a normal distribution of this retailer's ordering behaviour can be depicted with a mean of 2000, and a standard deviation of 67 based on 68-95-99.7 rule. If the retailer's order of 1600 truly reflects market demand, this distribution is adjusted with a mean of 1600. In this setting, cost is fixed at 0.9, price is 2, and salvage is 0.5. Therefore, optimal quantities can be calculated (see Table 4.3). Performance is measured by the gap between optimal quantity and the participant's ordering quantity. Thus, less deviation indicates better performance.

| | **Actual market demand** | |
|---|---|---|
| | 1600 | 2000 |
| **Overage penalty, $C_0$** | 0.4 | 0.4 |
| **Underage penalty, $C_u$** | 1.1 | 1.1 |
| **Critical ratio** | 0.7333 | 0.7333 |
| **z** | 0.63 | 0.63 |

| | | |
|---|---|---|
| **Optimal quantity** | 1643 | 2043 |

*Note:*

*$C_0$=cost-salvage; $C_u$=price-cost; Critical ratio=$C_u/(C_0+C_u)$*

**Table 4. 3** Performance measure - Optimal quantity from newsvendor model

### 4.5.5 Reflection

This section mainly justifies the experiment design presented in the previous sections. This study adopts an online scenario-based role play (SBRP) experiment that encompasses carefully designed vignettes for the participants to respond to. Experimental vignette is very useful when the exercise of control over independent variables is in need (Aguinis and Bradley, 2014). Since the combinations of levels of social capital on three dimensions are generated and presumed, it provides significant potential for the manipulation of independent variables. The independent variables, three dimensions of social capital that incorporate rich conceptualizations and facets, are reasonably and suitably presented in the vignette. Although it has multiple aspects along each dimension, the vignettes present simplified versions of interpretations of social capital. For example, the structural social capital has three facets: network ties, network configuration, and appropriable organization (Nahapiet and Ghoshal, 1998a). However, structural capital is usually simplifies as “social interaction” in many studies (Krause et al, 2006, Wu et al, 2014). Similarly, relational capital, which includes trust, norms, obligations (Nahapiet and Ghoshal, 1998a), and identification is often simplified as “trust” (Li et al, 2014). Cognitive capital, which includes shared codes and language, shared narratives, and shared tacit knowledge (Nahapiet and Ghoshal, 1998a), is simplified as “shared vision” (Li et al, 2014). Therefore, the description of social capital on each dimension follows the extant examples, and eliminates the factors that are not commonly measured. Three dimensions are properly represented by their respective mostly recognised features. In addition, the vignette also includes descriptions of product substitution and decision-making scenario. Both are clearly stated and simplified to ensure that the participants understand it correctly by trial and pilot study. Therefore, although this study includes complex concepts, it is reasonable to state that this experiment setting

provides appropriate simulation of variables by following extant examples in published work.

## 4.6 Data collection

Sampling, one of the most important elements in any research design, refers to the process of recruiting a sample, which is defined as "a group of units, proportion of material, or observations taken from a larger collection of units, quantity of material, or observations that serves to provide information that may be used as a basis for making a decision concerning the larger quantity" (Berger et al., 2006). The basic idea of sampling is to reach some of the elements in a population based on which a conclusion is drawn that can be generalised to the whole population (Cooper and Schindler, 2014). The sampling process is highly efficient in terms of money, time and effort, especially when it is not feasible to examine the whole population and maintain the quality of the study at the same time. Since this study concerns both manufacturers and retailers who have launched private labels, it would be quite time-consuming and inefficient to generate and analyse the exhaustive list of manufacturers that fall into this category. Therefore, a proper sampling strategy is of utmost importance in this research as it provides greater accuracy of results, greater speed of data collection, and increased availability of population elements (Cooper and Schindler, 2014).

### 4.6.1 Population

The first step in identifying a proper sample is to determine the population from which the sample will be drawn. According to Cooper and Schindler (2004), a population is the total collection of elements about which we wish to make some inferences. As discussed in previous chapters, this study aims to investigate the influence of social capital over manufacturers' perceptions regarding their retailers' information sharing behaviour in the presence of potential vertical competition. Therefore, the initial sampling strategy requires the recruitment of manufacturers

who not only have official outlets but are also actively trading with retailers with newly launched private labels. Since the experiment provides a vignette which details conditions and information to support decision making, it is reasonable to extend the target population to people with B2B experience, preferably those in manufacturing sections.

The experiment is launched online in the United States of America. Data collection is completed by the online survey service provider Qualtrics, which is proficient at reaching a wider geographical area and obtaining high-quality data from the target population.

### 4.6.2 Sample size

There are numerous ways to determine the sample size of a study. For example, the adequate sample size can be determined by using a rough method proposed by Gillham (2007): 50 – very poor, 100 – poor, 200 – fair, 300 – good, 500 – very good, 1000 or more – excellent. The sample size can also be determined by the ratio of responses to independent variables. There is no consensus on this ratio, ranging from the lower limit of 5:1 to an ideal ratio of 15:1 (Stevens, 1996). This study contains three independent variables (structural, relational and cognitive capital), one moderating variable (the level of product substitution between private label and national brand products), and three control variables (experience in B2B, employment level and individual cognitive reflection). Referring to an ideal ratio of 15:1, this setting has a recommended sample size of 105. However, this amount indicates a poor sample size according to the guidelines proposed by Gillham (2007). Researchers are encouraged to use a sample that is as large as possible within the economic budgets of the research (Noorzai, 2005) as the sufficiency of the sample size is vital for various statistical data analyses. Hair et al. (2006) stress that sample sufficiency in data analyses is important for two major reasons. The first is that weaker relationships between variables can be revealed and examined as the power increases as the sample size increases, and the second is the generalisability of the

results. Based on the considerations above, this study aims to reach a sample size of 300, with 100 in each group.

Since this experiment requires the subjects to make production decisions, employment level and B2B experience are controlled. Thus, responses are collected from people who have a full-time job and preferably have experience in B2B sections. A sample size of 371 has been obtained, with 119, 126, and 126 in the three groups respectively.

4.6.3 Screening and conduction

To obtain responses of high reliability and quality, a cover letter is attached at the beginning of the experiment with clear instructions to support participants in the experiment. Subjects participate in this online experiment at their convenience. Being in a comfortable environment can hopefully increase the number of well-thought responses and completion rates.

Furthermore, a couple of screening criterions are employed to ensure the quality of the responses. The answers to different questions are compared to ensure the creditability and quality of the responses. Each response is examined so that answers to different demographic questions are not contradictory. Responses with contradicting answers are eliminated. The following standards are employed in the screening process. Firstly, subjects reported to be students are excluded. Secondly, B2B experience and age are compared as it is reasonable to eliminate responses from the individuals whose experience in B2B (in years) is higher than their age. Responses with too small a gap between age and experience are excluded. Since the legal working age is 18 in most regions, a minimum gap of 18 between these two values is guaranteed. For example, it is not possible for a subject who claims to be 27 years old to have 18 years of B2B experience.

In addition, a few attention checks are inserted between different blocks of questions to ensure that the subjects remain concentrated throughout the experiment.

Response to questions is forced so the subjects will not skip or miss important questions.

## 4.7 Pilot study

A pilot study is a trial run-through to test the research design with a subsample of respondents who have characteristics similar to those identifiable in the main sample to be surveyed (Gill and Johnson, 2010) by examining "research protocols, data collection instruments, sample recruitment strategies, and other research techniques in preparation for a larger study" (Polit and Beck, 2004). It aims to identify weaknesses in research design and instrument development and to provide proxy data for selection of a probability sample (Cooper and Schindler, 2014). Conducting a pilot study is necessary because it is difficult to predict the subjects' interpretations and queries in response to the questions (Gill and Johnson, 2010). For many large-scale with "one-shot" data collection methods, the lack of a pilot study would expose the research to potential unknown risks, resulting in significant inefficiency and waste.

As specified by Cooper and Schindler (2014) in their questionnaire piloting guidelines, Gillham (2007) suggests a two-round trial before launching the pilot study. Unlike most researchers who advocate the use of samples from the target population, Gillham (2007) suggests recruitment outside the target population. The first round of the trial involves recruiting one or two people outside the target population to answer the initial list of questions. This step allows the researcher to directly observe the reactions of the participants whose knowledge in the area of interest is not their strength. This would help the researcher spot the questions or items that are not stated clearly enough. After the questions are amended, the second round of the trial involves two or three people who are similar to but still outside the target population. Improvements, deletions and additions should be made based on the feedback from these individuals.

This two-round trial has been conducted in Durham University Business School,

recruiting both colleagues with and without relevant B2B experience. The first round of the trial eliminated the ambiguity in the questions. The experimental vignette, the measuring instrument of dependent variables were improved from the perspectives of language, wording, clarity and layout. The second round involved colleagues with B2B experience. In this round, a few items take from previous studies were deleted to ensure the appropriateness of the scale. Irrelevant items regarding information sharing have been taken out of the experimental measure. This process, mainly concerned with internal validity, will be further discussed in Section 4.8.1.

Following this two-round trial, the questionnaire is ready for pilot study in the traditional sense, where a subsample of the target population is recruited. The size of the pilot group ranges from 25 to 100 subjects (Cooper and Schindler, 2014). Since this experiment adopts a 1X3 setting, the expected subject quantity is around 30. A total of 32 responses are recorded. 13 of them are taken in the group exposed to the perfect substitution treatment, nine in the group exposed to the no substitution treatment, and ten in in the group exposed to the unknown substitution treatment. Reliability is tested in the pilot study by examining the Cronbach's alpha value and item-to-total correlation. The scale being tested measures the retailers' perceptional trustworthiness. This scale contains six items. The Cronbach's alpha value for this scale is 0.809, which is higher than the widely-accepted standard of 0.7. Thus, this scale is reliable in terms of the Cronbach's alpha. The item-to-total correlation for each item is higher than 0.50, indicating acceptable reliability. Both the Cronbach's alpha value and the item-to-total correlation indicate that the scale has good reliability in this experiment.

## 4.8 Reliability and validity

In the context of research, measurement is concerned with assigning numbers to empirical events, objects or properties, or activities in compliance with a set of rules (Cooper and Schindler, 2014). Cooper and Schindler (2014) consider measurement as a three-part process:

1. Selecting observable events.
2. Developing a set of mapping rules: a scheme for assigning numbers or symbols to represent aspects of the event being measured.
3. Applying the mapping rule(s) to each observation of that event.

It is of critical importance to establish the rules that can generate reliable data of high quality which is capable of supporting defensible statistical inferences. The measuring tools and scales that have been used to collect data must be internally valid and reliable (Gray, 2013). Considered as important tools of an essentially positivist epistemology (Golafshani, 2003), reliability and validity are the most used assessment criteria to measure the appropriateness of a scale in a study. Every effort has been made to ensure the reliability and validity of this study at every stage of research design. There is only one scale involved in this study, which measures subjects' perceptions of a retailer's trustworthiness depicted in the vignette. This section primarily discusses the measures and analysis results of the reliability and validity of this scale.

### 4.8.1 Reliability

Before proceeding with data analysis and discussion of the results, reliability should be viewed as a basic requirement of the measuring instrument (Campbell and Stanley, 1963). As cited by Golafshani (2003), Joppe (2000) defines reliability as:

> *"…The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable."*

As has been identified by Golafshani (2003), reliability can be parcelled out into three types in quantitative research: (1) the degree to which a measurement, given repeatedly, remains the same; (2) the stability of a measurement over time; and (3) the similarity of measurements within a given time period (Joppe, 2000). The

reliability of a scale at different times and under different conditions can be examined from three perspectives: stability, equivalence, and internal consistency (see Table 4.4). Usually, the reliability of a scale is marked by a coefficient ranging from 0.00 (very unreliable) to 1.00 (perfectly reliable) (Gray, 2013).

| Type | Coefficient | What Is Measured | Methods |
|---|---|---|---|
| **Test-Retest** | Stability | Reliability of a test or instrument inferred from examinee scores; the same test is administered twice to the same subjects over an interval of fewer than six months. | Correlation |
| **Parallel Forms** | Equivalence | The degree to which alternative forms of the same measure produce same or similar results; administered simultaneously or with a delay. Interrater estimates of the similarity of judges' observations or scores. | Correlation |
| **Cronbach's Alpha** | Internal consistency | The degree to which instrument items are homogeneous and reflect the same underlying constructs. | Specialised correlational formulas |

*Taken and adapted from Cooper and Schindler (2014)*

**Table 4. 4** Summary of reliability estimates

Stability ensures consistent results generated by repeated measurement of the same person with the same instrument (Cooper and Schindler, 2014). Such stability in test results indicates a high level of reliability of the scale that is used to produce these results (Joppe, 2000). The consistency of a questionnaire can be determined by observing whether an individual's scores remain relatively similar through a test-retest method at two different times (Joppe, 2000). Reliability concerns the consistency of a measure and depicts the estimated degree to which the measurement is free of random or unstable error (Cooper and Schindler, 2014). The results from a test-retest method should be statistically similar if the scale is stable. The proof of the consistency and stability of the measuring tool is considered as a major benefit of reliability (Sekaran and Bougie, 2006); however, assessing the reliability from the perspective of stability would be challenged by the limited opportunity for resurvey and certain other difficulties such as time delay between measurements, insufficient time between measurements, respondents' discernment

of a study's disguised purpose, or topic sensitivity (Cooper and Schindler, 2014). Although Cooper and Schindler (2014) have suggested a longer interval between the test and retest (from two weeks to a month) to reduce some biases, they also warn readers about exposure to contamination caused by outside factors when there is a longer interval between two tests.

Examining reliability from the perspective of equivalence involves considerations of how much error may be introduced by different investigators or different samples of items being studied in questioning or scales (Cooper and Schindler, 2014). Compared to stability, which is concerned with personal and situational variations between two tests, equivalence observes the difference among observers and items at one point in time (Cooper and Schindler, 2014). When the response is collected from a subject using a set of items, this person is categorised. If this person is classified into the same category by two tests, then the equivalence of these tests is acceptable. However, it is extremely difficult to find two sets of fully equivalent and interchangeable items in practice, even with sophisticated procedures executed by publishers of standardised tests (Cooper and Schindler, 2014).

Internal consistency requires only one administration of the scale to assess the homogeneity among the items (Cooper and Schindler, 2014). The examination of internal consistency usually employs the split-half technique, whereby similar questions in the same scale are split into two halves. The high correlation between the two halves indicates high reliability with regard to internal consistency (Cooper and Schindler, 2014). Such correlation can be calculated in several ways, the most common of which is Cronbach's alpha. It was proposed by Lee Cronbach in 1951 (Tavakol and Dennick, 2011) and represents the average value of all possible split-half correlations and measures the consistency of all items in both global and individual senses (Gray, 2013). A high Cronbach's alpha value represents high internal consistency, while a low Cronbach's alpha value indicates low internal consistency, hence unacceptable reliability. Acceptable Cronbach's alpha values vary across

different disciplines, ranging from 0.70 to 0.95 (Tavakol and Dennick, 2011). Table 4.3 offers a guideline for the interpretation of Cronbach's alpha values. A Cronbach's alpha value is considered acceptable when it is above 0.7. This pass-line is considered applicable in business and management studies. Besides Cronbach's alpha, item-to-total correlation, which measures the correlation of each single item with the total scale score, is also examined. Item-to-total correlation higher than 0.50 represents reliability (Robinson et al., 1991).

| Cronbach's alpha | Rule of thumb |
|---|---|
| <.5 | Unacceptable |
| >.5 | Poor |
| >.6 | Questionable |
| >.7 | Acceptable |
| >.8 | Good |
| >.9 | Excellent |
| *Taken from (George and Mallery, 2003)* | |

**Table 4. 5** Rules for Cronbach's alpha value interpretation

In this experimental setting, the perceived trustworthiness of a retailer is measured before and after the introduction of the treatment. The average time spent in this experiment for each subject is 15.3 minutes. Compared to the interval suggested by Cooper and Schindler (2014), which lasts from two weeks to a month, the interval between these two tests is extremely short. Thus, the test-retest method is not appropriate to test the reliability of the measurement. Moreover, testing equivalence to confirm reliability is also not appropriate due to the lack of an alternative set of measurements and the difficulty involved in accessing a set of fully equivalent and interchangeable items in practice. Internal consistency is examined in this study to confirm the reliability of the scale that measures the perceptional trustworthiness of the retailer. In this study, reliability, reflected by internal consistency, is assessed through two measures: item-to-total correlation and the Cronbach's alpha value.

| Construct | Items | Pre-test | | Post-test | |
|---|---|---|---|---|---|
| | | Cronbach's | Item-to- | Cronbach's | Item-to- |

| | | alpha | total correlation | alpha | total correlation |
|---|---|---|---|---|---|
| **Perceptional Trustworthi-ness** | PT1: This retailer shares insufficient information intentionally. | 0.905 | 0.651 | 0.909 | 0.674 |
| | PT2: This retailer shares irrelevant information intentionally. | | 0.706 | | 0.705 |
| | PT3: This retailer misleads our company intentionally. | | 0.775 | | 0.801 |
| | PT4: This retailer delays sharing information intentionally. | | 0.741 | | 0.804 |
| | PT5: This retailer shares obscure information intentionally to gain a competitive advantage. | | 0.784 | | 0.758 |
| | PT6: This retailer exaggerates the seriousness of a problem to gain more information than stated in contracts intentionally. | | 0.770 | | 0.743 |

**Table 4. 6** Reliability test results of the experimental measuring instrument

For each group assigned with different private label product substitution levels, participants specify their perceived likelihood of certain opportunistic behaviours on a 7-point Likert scale. The items adopted to describe opportunistic behaviour are adapted from Hill et al. (2009) in terms of deceitful unethical behaviour, and from Li and Lin (2006) in terms of perceived information quality. Since this perception is tested twice – before and after treatment – the reliability test is conducted twice in both pre-test and post-test scenarios. The results of the item-to-total correlation and the Cronbach's alpha values are shown in Table 4.6. In both pre-test and post-test, the item-to-total correlation for each item is higher than 0.50, indicating acceptable reliability. In both tests, the Cronbach's alpha values are higher than 0.9, exhibiting high reliability. Thus, this six-item scale, which measures subjects' perceptions of the retailer's trustworthiness under different levels of product substitution, is proven to

be highly reliable in this study.

### 4.8.2 Validity

The validity of a research instrument is largely dependent on its reliability (Litwin and Fink, 1995). Once the reliability of the measuring scale is confirmed, validity can be reasonably discussed. According to Gray (2013), the validity of a measurement ensures that the research measuring instrument measures what it is designed to measure, which is the perceptional trustworthiness of the retailer in this study.

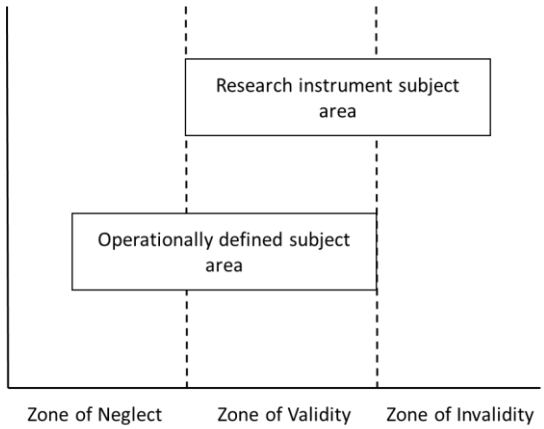


**Figure 4. 3** The relationship between research instrument and operationally defined subject areas and the issue of validity

Figure 4.3 (taken from Gray, 2013) depicts the relationship between the research instrument and operationally defined subject areas and the issue of validity; some of the operationally defined subjects are not involved in the research instrument subject (Zone of Neglect), while part of the research instrument subject is not operationally defined (Zone of Invalidity) (Gray, 2013). Based on this consideration, the finalised version of the research measurement must fall into the overlapping area of the operationally defined subject area and the research instrument subject area.

There are eight different types of validity: face, internal, external, criterion, construct, content, predictive and statistical validity (Gray, 2013). These eight types are not exclusive, with some of them overlapping others. Normally, two varieties of validity are considered: internal validity and external validity. Internal validity ensures the confirmation and the matching of the demonstrated experimental relationship and

the cause to the result, while external validity addresses the generalisation of the observed causal relationships across different persons, tasks, settings, and times (Cooper and Schindler, 2014).

A widely-accepted classification of validity contains three major forms, namely content validity, criterion-related validity, and construct validity (Cooper and Schindler, 2014).

The content validity of a measuring instrument describes the degree to which it provides adequate coverage of the investigative questions that guide the research (Cooper and Schindler, 2014). It validates the content of a test, which is operationalised from related content domains for the measuring instrument. The content validity is good if the measuring instrument includes a representative sample of the universe within which the subject matter of interest resides (Cooper and Schindler, 2014). Thus, it is reasonable to assess content validity by comparing the scale to relevant academic theories and findings in the extant literature.

According to Cooper and Schindler (2014), there are two ways to assess the content validity of an instrument involving judgement from both the researcher and a panel of other individuals. The first way requires the researcher to judge the content of a research instrument by examining the definition of the topic, scales and the involved items. Therefore this procedure varies from case to case. The second way requires a panel of individuals to label the items as “essential”, “useful but not essential”, or “not necessary” to determine the quality of the instrument.

In this study, the participants specify the perceived likelihood of retailers enacting certain opportunistic behaviours on a 7-point Likert scale. The items adopted to describe opportunistic behaviour are adapted from Hill et al. (2009) in terms of deceitful unethical behaviour, and from Li and Lin (2006) in terms of perceived information quality. In total, there are seven items that measure unethical behaviour in supply chains which are divided into two categories: subtle unethical behaviours

and deceitful unethical behaviour. Three items, which are concerned with opportunistic behaviour and are enacted through the manipulation of information, have been taken and adapted. Five items from Li and Lin (2006) were firstly included to measure the perceived information quality in the initial versions of the scale. This scale was then shown to a panel of colleagues at Durham University Business School and then reduced to three to ensure content validity. Out of the five items in scale measuring information quality proposed by Li and Lin (2006), three items – relating to information timeliness, sufficiency, and accuracy – are taken and adapted to measure perceived information quality in this study. All the items in this scale, which have been well-developed and validated in previous studies by a number of researchers in the specific area of supply chain management, are adapted and reviewed to match the context of this particular study; this scale is proposed to have good content validity.

Criterion-related validity reflects the success of the measuring instrument used for prediction or estimation (Cooper and Schindler, 2014). To test the criterion-related validity of a new measuring instrument of a concept, Gray (2013) suggest to compare how people answer this measure to the way they answer existing, widely-accepted measures of a concept. If the results produced by the old and new measures are highly correlated, then the new measure of this concept is assumed to possess high criterion-related validity (Gray, 2013). However, the lack of well-established and widely-accepted measures of many concepts have prevented a wide range of new studies from further confirming the validity of any newly proposed measuring instruments, including this one. Within the scope of this study, perceptional trustworthiness, which is reflected through opportunistic information sharing behaviours, is newly established and has received minimal attention in the extant literature. Thus, criterion-related validity is not considered in this study.

As explained by Gray (2013), construct validity is concerned with “the measurement of abstract concepts and traits, such as ability, anxiety, attitude, knowledge, etc. and

is concerned with whether the indicators capture the expected relationships among the concepts being researched" (Cook and Campbell, 1979). These traits must be operationally defined before they can be measured (Gray, 2013), and can be assessed using factor analysis and correlation analysis.

a. Internal validity

Internal validity refers to the validity of the causal inferences that can be drawn from experiments, achieved by ensuring that the causal relationship has been properly tested (Knemeyer and Naylor, 2011). Cooper and Schindler (2014) have identified several major factors that threaten the internal validity of an experiment from the perspectives of history, maturation, testing, instrumentation, selection, statistical regression, and experimental mortality.

Concerns regarding history and maturation are both caused by the passage of time. History refers to events that confound the effects of education efforts between pre-test and post-test. Maturation is not specific to any particular event; it includes hunger, boredom and exhaustion, which a subject is likely to experience during the experiment (Cooper and Schindler, 2014). The passage of time usually affects the validity of experiments that last from an hour or two to a longer period of time. In this study, the average time a subject takes to finish the experiment is 15.00 minutes. Compared to experiments with longer duration and intervals, it is less likely for the participants to experience the events that can either educate them on their understanding of the research content or cause discomfort. In addition, participants are encouraged to take the test at their convenience. Therefore, the negative effects posed by the passage of time on the validity of the experiment are restrained.

The testing effect, also known as the learning effect, is the influence on the results of the second test imposed by a subject's experience of taking the first test (Cooper and Schindler, 2014). Extant research has confirmed the existence of a correlation between test intervals and final test performance; subjects' performance is enhanced

when the interval between the initial test and the subsequent test increases (Roediger Iii et al., 2011). This improvement is usually not visible immediately after the first test but will become apparent after a substantial interval (Toppino and Cohen, 2009). As has been explained in previous paragraphs, the average duration of this study is 15.00 minutes. The interval between pre-test and post-test should not be considered as a threat to the validity of the measurement. Furthermore, the experimental vignette specifically explains that the production decisions made by participants only reflect their opinions and are not judged as right or wrong. Indicators of performance are not visible to the participants. Therefore, taking the tests cannot be counted as a learning experience.

The threat posed by instrumentation lies in the change in observer and measurement, which is not applicable in this study (Cooper and Schindler, 2014). Selection of subjects can sometimes diminish the internal validity of an experiment if the composition of experimental and control groups are markedly different (Cooper and Schindler, 2014). This problem can mostly be overcome by random assignment of subjects. Section 5.2.1 includes descriptive analysis of the subjects' demographic information, which demonstrates that the compositions of all three groups are comparable.

In light of statistical regression, the internal validity of an experiment is affected if the groups are selected by the extreme values (Cooper and Schindler, 2014). In this study, each subject's perception of opportunistic behaviour is measured on a 7-point Likert scale and product decisions are recorded within a certain range. This design protects the experiment from the negative influence imposed by extreme values.

Experiment mortality poses a threat to an experiment's internal validity when a change is made to the composition of the groups (Cooper and Schindler, 2014). In this study, the composition of the groups remains constant from the initial pre-test to post-test, meaning this factor is not applicable in this study.

b. External validity

External validity is concerned with the generalisation of the observed causal relationships within the experimental subjects and settings to different persons, tasks, settings, and times (Cooper and Schindler, 2014). However, in the context of experimental studies, researchers' extensive level of control over experimental settings offsets external validity to some extent (Bachrach and Bendoly, 2011). This phenomenon is particularly common in traditional behavioural experiments, especially laboratory experiments using students are subjects, because a high level of realism is difficult to achieve (Knemeyer and Naylor, 2011).

While internal validity can be achieved through rigorous design, solving external validity is not as easy. Cooper and Schindler (2014) have categorised the threats to external validity into three major forms: the reactivity of testing on the experimental treatment, interactions between the selection and X, and other reactive factors. The first potential threat to external validity is the reactivity of testing on the experimental treatment; subjects are likely to be sensitised in the pre-test so that they respond to the experimental treatment differently. The second threat lies in the subjects recruited in the experiment; the results drawn from the responses from people who agree to take part in the research may not be applicable to the people who refuse to participate. The final threat relates to the experiment setting, which may bias the subjects' responses and consequently distort the effect of the experimental treatment.

Cooper and Schindler (2014) propose a rule of thumb in validating the experiment: first seek internal validity, and then try to secure as much external validity as possible by making the experimental conditions similar to those under which the results will be applied. Furthermore, external validity is inherently addressed in the nature of this study; it adopts an SBRP experiment, which improves experimental realism and also enables researchers to manipulate and control independent variables, thereby simultaneously enhancing both internal and external validity (Aguinis and Bradley,

2014). Based on the discussion above, it is reasonable to argue that this study has an acceptable level of external validity.

### 4.8.3 Confirmatory factor analysis

Confirmatory factor analysis (CFA) is a powerful statistical method to address the validity of a construct. It provides diagnostic information about the measurement error, reliability and validity of a measurement scale (Bagozzi et al., 1991). It tests priori hypotheses on relationships between observed variables and the latent variable, and then produces results for developing and refining measurement instruments, assessing construct validity, identifying method effects, and evaluating factor invariance across time and groups (Brown, 2006, Jackson et al., 2009). Therefore, it is reasonable to use CFA to test the validity of the measurement model.

As suggested by Hair et al. (2006), factor loading, average variance extracted (AVE) and construct reliability are the three ways to estimate the relative amount of convergent validity among item measures. This study follows the good rule of thumb proposed by Hair et al. (2006). For factor loadings, standardised loading estimates should be at least 0.5, and ideally 0.7 or higher. For AVE, a value of 0.5 or higher suggests adequate convergence. For construct reliability, the lower limit is 0.7 (Hair et al., 2006).

As shown in Table 4.5, all the items load on the latent variable, i.e. the perception of the retailer's opportunistic information sharing behaviour, with standardised loadings ranging from 0.70 to 0.88. Minimum loading (=0.70) and the AVE (=0.62) both exceed the threshold of 0.5 proposed by Hair et al. (2006). Construct reliability is 0.90, which exceeds the threshold of 0.7. Therefore, unidimensionality and convergent validity for the measurement model is acceptable. Since only one construct is included in this study, tests for discriminant validity and nomological validity are not applicable. This study has also assessed the goodness-of-fit of the measurement model. The overall fit of the CFA measurement model to the data is adequate: chi-square (df=7)=25.9; Tucker Lewis Index [TLI] = 0.97, Comparative Fit Index [CFI] = 0.99; CFI=1.00; and Root

Mean Square Error of Approximation [RMSEA] = 0.08.

| Construct | Items | Std loading | Error term |
|---|---|---|---|
| Perception of the retailer's opportunistic information sharing behaviour | This retailer would share insufficient information intentionally. | 0.71 | |
| | This retailer would share irrelevant information intentionally. | 0.70 | 0.07 |
| | This retailer would mislead our company intentionally | 0.88 | 0.08 |
| | This retailer would delay sharing information intentionally. | 0.85 | 0.08 |
| AVE = 0.62 | This retailer would share obscure information intentionally to gain a competitive advantage. | 0.77 | 0.08 |
| Composite reliability = 0.90 | This retailer would exaggerate the seriousness of a problem to gain more information than stated in contracts intentionally. | 0.81 | 0.09 |

**Table 4. 7** Factor loadings of the measurement model

## 4.9 Common method variance

Common method variance (CMV), also known as common method bias, refers to the variance that is attributable to the measurement method rather than to the constructs the measures represent (Podsakoff et al., 2003). Williams and Brown (1994) address the general perspective on CMV that it will cause overestimation and inflation of the correlation between variables. Based on the extant literature, Podsakoff et al. (2003) have identified four sources of CMV: a common rater, a common measurement context, a common item context, and the characteristics of the items themselves.

CMV can be controlled through careful design of the study's procedure and/or statistical techniques (Podsakoff et al., 2003). In order to control CMV researchers are encouraged to obtain the predictor and criterion variables from different sources, or in different contexts. In this study, the predictor and criterion variables are obtained from different sources. Independent variables are structural, relational and cognitive

dimensions of social capital, which were generated before the experiment and displayed to participants directly. Dependent variables have been recorded as the participants go through the experiment.

## 4.10 Ethical issues

Besides obtaining high-quality data and drawing the most meaningful and insightful findings in this study, the researcher aims to build this study on an ethical basis as well. As stated by Cooper and Schindler (2014), ethics are norms or standards of behaviours that guide choices about our behaviour and our relationships with others; this concept, in the context of research, ensures that nobody is harmed or suffers from adverse consequences as a result of research activities. Researchers should choose the most appropriate research methodology and conduct it in a responsible and morally defensible way (Gray, 2013).

In the real world, researchers will undoubtedly interact with people and things that might affect them; ethical issues exist throughout the processes of research, covering the planning, implementation and reporting stages (Gray, 2013). This study is conducted with ethical approval granted by Durham University, which makes it mandatory for doctoral students to have training sessions on research ethics and an approved ethical application before the data collection stage.

The author respects the rights of all the participants who engaged in the experiment. To safeguard the research participants' rights and protect them from harm of any form, Cooper and Schindler (2014) propose three guidelines that the researcher should follow:

1. *Explain study benefits.*
2. *Explain participant rights and protections.*
3. *Obtain informed consent.*

The author provided a cover letter which explained the objective, process, and

contacts of the research. All the participants in this experiment were treated with anonymity and confidentiality regarding their participation. Participants were informed that their responses would only be used for this doctoral study and would not be disclosed to any third parties. Their responses were not assessed or judged using the right or wrong criteria. Participants were assured that they could terminate their participation in the experiment at any time with no penalty. Data was collected on the Qualtrics platform and then downloaded and entered into an SPSS file, which was saved on a password-protected computer and a Dropbox account both accessible only by the author.

## 4.11 Conclusion

This chapter has presented the philosophical and methodological perspectives employed for investigation of the hypotheses in detail. An SBRP online experiment has been adopted as the data collection method and has been discussed and justified through an examination of the extant literature on research design. The design of this experiment has been considered in detail, including the methods, literature and theories that have been employed in the development of the vignette, the manipulation of independent variables, and the introduction of the experimental treatment. The scale used to measure perceptional trustworthiness, along with the items it contains, has been developed from papers on the relevant topics and has been proven to be reliable and valid by a panel of colleagues and a pilot study. This chapter has also discussed the sample population targeted for data collection. The last section of this chapter presents the considerations and measures taken to ensure the ethicality of this study. Following the research design and data collection procedures described in this chapter, the Chapter Five will present the results of the experiment as well as the statistical analysis and results achieved through the data.

# CHAPTER 5 RESULTS AND ANALYSIS

## 5.1 Introduction

The aim of this study is to investigate the retailers' perceptional trustworthiness, reflected by manufacturers' perceptions of retailers' trustworthiness in the presence of vertical competition and the role of cognitive reflection in organisational performance. The last chapter details the SBRP online experiment, which is carefully designed to collect data from the target population to test the conceptual framework proposed in Chapter Three. In order to test the hypotheses, this chapter presents the data obtained from the experiment and the results of the statistical analysis.

Data collection has been conducted using the online survey service provider Qualtrics (https://www.qualtrics.com/). Various techniques have been used to ensure the quality and completeness of a response, for example, forced response, attention checks, etc. Thus, there is no missing data. This chapter firstly presents the preliminary results, testing of the treatment, and then provides the results of hypotheses testing by statistical analysis.

## 5.2 Preliminary analysis

This part will include the descriptive analysis and a preliminary correlation analysis of key variables. Since the relationship between some variables is proposed in the hypotheses, it is necessary to obtain a basic understanding of the sample and their responses. The first part of this section will present a descriptive analysis of the demographic characteristics of the subjects. The second part will present and discuss the results of the correlation analysis among the key variables involved in this study.

### 5.2.1 Sample descriptions

This section will discuss the main demographic characteristics of the sample. Descriptive analysis will be conducted on gender, age, employment level, and B2B

experience. To control the influence of these factors may have on the outcome, demographic information for participants in all three groups is comparable. The results will be presented below. In Group 1, the participants are exposed to the scenario where the newly launched private label product is not substitutable to national brand products at all. In Group 2, the newly launched private label product is a perfect substitute for national brand products. In Group 3, the substitution level between the private label and national brands is unknown.

a. Gender

Table 5.1 presents the gender distribution of the sample, with 45% of the sample being male and 55% being female. Although whether gender would affect the influence of social capital on the perceptional trustworthiness of a retailer is not considered in this study, it is necessary to examine the gender distribution as a strong gender difference has been observed in many studies related to decision making from the perspective of cognitive abilities (Frederick, 2005, Hoppe and Kusterer, 2011).

| **Values** | **Group 1** | **Group 2** | **Group 3** |
|---|---|---|---|
| 1.00 Male | 51 (42.9%) | 58 (46%) | 58 (46%) |
| 2.00 Female | 68 (57.1%) | 68 (54%) | 68 (54%) |
| Total | 119 | 126 | 126 |

**Table 5. 1** Sample gender distribution

b. Age

| **Age Group** | **Group 1** | **Group 2** | **Group 3** |
|---|---|---|---|
| 18-30 | 40 (33.6%) | 32 (25.4%) | 34 (27%) |
| 31-40 | 19 (16%) | 28 (22.2%) | 24 (19%) |
| 41-50 | 21 (17.6%) | 24 (19.1%) | 20 (15.9%) |
| 51-60 | 15 (12.6%) | 16 (12.7%) | 21 (16.7%) |
| 61 and above | 24 (20.2%) | 26 (20.6) | 27 (21.4%) |
| Total | 119 | 126 | 126 |

**Table 5. 2** Sample age distribution

In the process of decision making, age plays a critical role in the speed of processing information and working memory (Murman, 2015). Therefore, it is reasonable to investigate the age distribution of the sample. Table 5.2 presents the distribution of age in the sample, which is roughly comparable across the groups.

c. Experience and employment

| Variable | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| **Experience** | | | |
| 0 | 47 (39.5%) | 48 (38.1%) | 48 (38.1%) |
| 1-5 | 25 (21%) | 24 (19%) | 24 (19.0%) |
| 6-10 | 19 (16%) | 15 (11.9%) | 16 (12.7%) |
| 11-15 | 6 (5%) | 12 (9.5%) | 6 (4.8%) |
| 16 and above | 22 (18.5%) | 25 (19.8%) | 32 (25.4%) |
| **Employment level** | | | |
| Self-employed | 13 (10.9%) | 31 (24.6%) | 30 (23.8%) |
| Staff | 59 (49.6%) | 53 (42.1%) | 54 (42.9%) |
| Supervisor | 17 (14.3%) | 13 (10.3%) | 13 (10.3%) |
| Middle manager | 17 (14.3%) | 17 (13.5%) | 20 (15.9%) |
| Top manager | 11 (9.2%) | 11 (8.7%) | 6 (4.8%) |
| Unemployed | 2 (1.7%) | 1 (0.8%) | 3 (2.4%) |

**Table 5. 3** Sample B2B experience and employment level distribution

Table 5.3 presents the sample distribution of B2B experience and employment level. 39% have no B2B experience, 44.6% have 5 – 20 years of B2B experience, and 33.7 % are at the management level. Although there is no clear evidence to support the argument that experience in B2B and employment level would influence one's judgement of the trustworthiness of others, it is hoped that these variables can differentiate people in their trusting behaviour and their subsequent decision making when facing a potential business threat.

d. Education

Table 5.4 presents the sample's educational level distribution. Because academic studies results in better decision quality (Klein, 1999), it is necessary to record experimental subjects' education levels. Participants who have obtained their degrees from colleges and universities constitute around 75% of the sample, and around 15% hold a graduate degree.

| Education | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| High school and below | 18 (15.1%) | 19 (15.1%) | 19 (15.1%) |
| College degree | 40 (33.6%) | 44 (34.9%) | 44 (34.9%) |
| Bachelor's degree | 44 (37%) | 44 (34.9%) | 44 (34.9%) |
| Master's degree | 13 (10.9%) | 13 (10.3%) | 13 (10.3%) |
| Doctorate degree | 4 (3.4%) | 6 (4.8%) | 6 (4.8%) |
| Total | 119 | 126 | 126 |

**Table 5. 4** Sample education level distribution

e. Cognitive reflection

| Values | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| 0.00 | 82 (68.9%) | 78 (61.9%) | 76 (60.3%) |
| 1.00 | 20 (16.8%) | 23 (18.3%) | 26 (20.6%) |
| 2.00 | 12 (10.1%) | 11 (8.7%) | 13 (10.3%) |
| 3.00 | 5 (4.2%) | 14 (11.1%) | 11 (8.7%) |
| Total | 119 | 126 | 126 |

**Table 5. 5** Sample cognitive reflection distribution

Cognitive reflection represents the ability to replace intuitive errors with more deliberative thought (Frederick, 2005). It is measured by the CRT, proposed by Frederick (2005); this is a performance-based measure containing three questions, with each inheriting an impulsive incorrect answer that needs to be suppressed (Frederick, 2005). Table 5.5 presents the subjects' cognitive reflection distribution. The majority of the experimental subjects scored 0 on this test (63.6%). 18.2% of

them scored 1 on this test. Only 9.7% scored 2. This percentage is particularly low in people who scored 3 on this test (8.1%). This concept is relevant because cognitive reflection is proven to be a more effective predictor of performance in the newsvendor model when compared to college major, experience and managerial position (Moritz et al., 2013).

The preliminary analysis presents the distribution of demographic information of the experiment subjects. Demographic data of the sample is different from that of pilot study in terms of distribution on age, experience in business-to-business, and education. Such difference should not be a major concern. In the first place, the experimental vignette and scale have been reviewed in a two-round trial before the pilot study, as suggested by Gillham (2007). This trial involves people outside the target population, whose knowledge in supply chain management is not their strength. At this stage, the experimental vignette has been simplified and clarified to ensure its readability to people whose expertise is outside supply chain management. In the second place, education and experience do not necessarily affect decision quality in ordering, because managers and students exhibit similar ordering behaviour and bias in the newsvendor model (Bolton, Ockenfels and Thonemann, 2012).

### 5.2.2 Means, standard deviations, and correlations among the variables

| Variables | Means | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Gender** | 1.55 | 0.50 | 1 | | | | | | | | | |
| **Age** | 43.74 | 15.93 | -.07 | 1 | | | | | | | | |
| **EXP** | 9.01 | 13.01 | -.24** | .56** | 1 | | | | | | | |
| **EMP** | 2.50 | 1.26 | 0.03 | -.13* | -.03 | 1 | | | | | | |
| **PSC** | 4.40 | 1.75 | -.01 | -.02 | -.03 | -.06 | 1 | | | | | |
| **PT** | 3.24 | 1.68 | -.06 | -.1 | -.03 | .02 | .43** | 1 | | | | |
| **PS** | 1.02 | 0.81 | -.03 | .02 | .02 | -.08 | .07 | -.15** | 1 | | | |
| **CR** | 0.62 | 0.96 | -.19** | -.02 | .07 | .00 | -.06 | .02 | .08 | 1 | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DEV1** | 177.36 | 156.04 | .04 | -.10 | -.07 | .01 | .09 | .20** | .02 | -.14** | 1 | |
| **DEV2** | 259.20 | 148.46 | -.06 | .08 | .00 | -.01 | -.09 | -.22** | .03 | .06 | -.79** | 1 |

*Note: N=371; EXP = B2B experience; EMP = employment level; PSC = Perceived social capital; PT = trustworthiness; PS = product substitution; CR = Cognitive reflection; DEV = deviation from optimal decision.*

**p < .05 (two-tailed); **p < .01 (two-tailed)*

**Table 5. 6** Means, standard deviations, and correlations among the variables

Table 5.6 shows the means, standard deviations, and correlations of the key variables in this study. Due to the unique measurement system employed, one of the key variables is transcoded from the variables that are directly observed. Perceived trustworthiness is measured through the manufacturer's perception of the retailer's opportunistic information sharing behaviour. Thus, high perceptional trustworthiness indicates a high perception of the retailer's opportunistic information sharing behaviour. Perceived social capital is measured based on the imposed level of social capital, for which there is a detailed explanation in Section 5.4.

Some of the correlations correspond to the hypotheses proposed in Chapter Three, while some do not. As presented in Table 5.4, perceived social capital is positively related to perceived trustworthiness ($r = .43$, $p < .01$). Performance is measured by the deviation of a subject's order from the optimal decision. Thus, less deviation means better performance. Perceived trustworthiness is positively related to such deviation when the retailer is acting opportunisticly ($r = .20$, $p < .01$). This correlation becomes negative when the retailer is indeed trustworthy ($r = -.22$, $p < .01$). This corresponds to what is predicted in Chapter Three, which proposes that perceived trustworthiness is negatively related to performance when the retailer is opportunistic and that perceived trustworthiness is positively related to performance when the retailer is trustworthy.

## 5.3 Testing of the treatment

In this study, manufacturers' perceptions could be an outcome of both social capital and other factors, for example, past experience and the ability to read and process information. Thus, we adopt the within-subject approach to eliminate the influences of the factors irrelevant to this study. A within-subject experiment design is preferable due to its internal validity, the boost in statistical power and its alignment with most theoretical mindsets (Charness et al., 2012). Although this approach suffers from the demand effect, we have concealed information regarding levels of treatment from subjects and compared the extent of perception changes between each pair of groups to minimise this drawback.

Paired-sample T-tests are used to compare the differences between the manufacturer's perception of the retailer's opportunistic behaviour before and after the introduction of private labels. Participants in Group 1 were informed that private label products are not substituted to national brands at all. Group 2 was informed that private label and national brand are perfect substitutes. Finally, in Group 3, participants were informed of the private label launch, but whether they are substitutes remains unknown. We have observed a significant decrease in the manufacturer's perception of the retailer's trustworthiness after treatment in each group. In Group 1, the mean reduces from 4.27 (SD = 1.49) to 3.53 (SD = 1.44), $t(118) = 5.50$, $p < 0.001$. In Group 2, the mean drops from to 4.39 (SD = 1.46) to 3.21 (SD = 1.45), $t(125) = 9.383$, $p < 0.001$. In Group 3, the mean raises from to 4.53 (SD =1.52) to 3.00 (SD=1.38), $t(125) = 9.863$, $p < 0.001$. Participants believe that retailers are more likely to behave opportunisticly after the introduction of private labels, regardless of the degree of product substitution. This partly confirms the effectiveness of our experimental treatment.

| | **Group 1** | | **Group 2** | | **Group 3** | |
|---|---|---|---|---|---|---|
| | **Before** | **After** | **Before** | **After** | **Before** | **After** |
| **Mean** | 4.27 | 3.53 | 4.39 | 3.21 | 4.53 | 3.00 |
| **SD** | 1.49 | 1.44 | 1.46 | 1.45 | 1.52 | 1.38 |
| **T** | t(118) = 5.498 | | t(125) = 9.383 | | t(125) = 9.863 | |
| **p** | p<.001 | | p<.001 | | p<.001 | |

*Notes: Group 1 – no substitution; Group 2 – perfect substitution; Group 3 – unknown substitution.*

**Table 5. 7** Comparison of perceptional trustworthiness before and after treatment

To fully confirm the effectiveness of the treatment, we expect to see the correspondence of the level of treatment and the extent of perception change. Figure 5.1 shows the rise in manufacturers' perceptions in the three groups. There is a significant difference in changes of perception between both the pair of group 1 (M = .74, SD = 1.46) and 2 (M = 1.17, SD = 1.40), t(243) = -2.37, p < .05 (two-tailed) and the pair of group 2 (M = 1.17, SD = 1.40) and 3 (M =1.52, SD = 1.73), t(239.777) = 1.75, p < .1 (two-tailed).

The change in participants' perceptions in each group corresponds to the level of treatment imposed. The analysis above proves the effectiveness of the treatment. It also provides support for Hypothesis 3 that different levels of product substitution will have impacts on the changes in manufacturers' perceptions of retailers' trustworthiness.

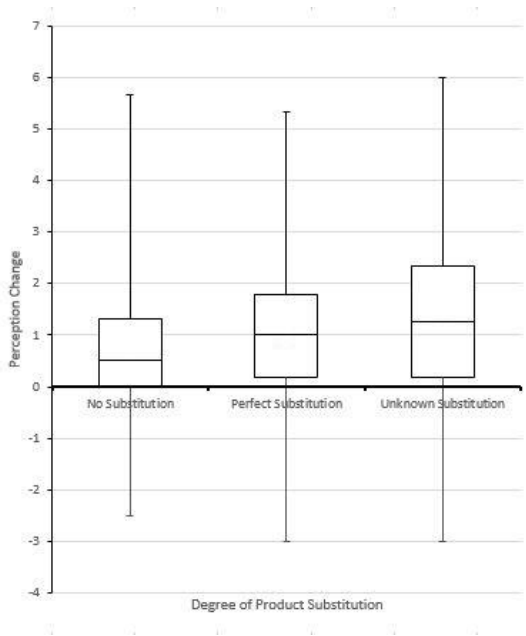


**Figure 5. 1** The change in perceptions after the introduction of the treatment

The scope of perception change in Group 3 (unknown substitution) is significantly higher than those in Group 1 (no substitution) and Group 2 (perfect substitution). When exposed to private labels with minimal information regarding their

substitutability, participants imposed by the same level of social capital are more likely to perceive their retailers as untrustworthy. The tendency introduced by uncertainty is even stronger than that in the worst case scenario, where private label products can perfectly replace national brands. Under this circumstance, we reason that uncertainty/ambiguity aversion is the major cause of participants' perception bias.

## 5.4 Hypothesis testing

H1 depicts the relationships between social capital and manufacturers' perceptions of their retailers' trustworthiness. In our experimental setting, information regarding social capital is embedded in the scenario, based on which participants generate perceptions of a specific retailer's trustworthiness, which is reflected through interpretations of the retailer's information sharing behaviour. Rungtusanatham et al. (2011) suggest checking the degree of correspondence between cued levels of factors of interest and participants' perceived levels of these factors. However, vignettes cuing social capital are generated randomly and transformed into 120 different versions. The workload would be tremendous if we compared them in pairs. Moreover, perceived social capital is under the combinational influences of cued social capital, which may be high in one dimension and low in others. The correspondence of cued social capital and perceived social capital on one dimension does not guarantee the correspondence on other dimensions. Thus, a regression analysis has been conducted to test the relationship between cued social capital and perceived social capital. Collinearity diagnostics show acceptable levels of tolerance ($T < .10$) and variance inflation value ($VIF < 10$), which suggests that the multicollinearity assumption is not violated. The results indicate that structural capital ($\beta = -.005$,ns), cognitive capital ($\beta = -.044$,ns) are not significant predictor, and that only relational capital can accurately predict participants' perceived social capital ($\beta = .121$, $SE = .05$, $t = 2.100$, $p < .05$):

- $\text{Perceived trustworthiness} = 3.006 - .004(\text{structural capital}) +$

$$.102(\text{relational capital}) - .035(\text{cognitive capital}) + e$$

Therefore, H1(b) and H1(c) are not supported by this outcome. Relevant statistics can be found in the following Table 5.8 and Table 5.9.

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .112[a] | 0.013 | 0.005 | 1.486 |
| *a. Predictors: (Constant), Structural, Relational, Cognitive* | | | | |

**Table 5. 8** Multiple regression model summary – H1

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 3.006 | .273 | | 11.030 | .000 | | |
| | Structural | -.004 | .042 | -.005 | -.087 | .931 | .928 | 1.078 |
| | Relational | .102 | .049 | .121 | 2.100 | .036 | .811 | 1.234 |
| | Cognitive | -.035 | .044 | -.044 | -.784 | .434 | .847 | 1.181 |
| *a. dependent variable: Perceived trustworthiness* | | | | | | | | |

**Table 5. 9** Multiple regression coefficients – H1

To further test H1(a), a regression analysis is used to investigate the relationship between cued relational capital and manufacturers' perceptions of the retailer's trustworthiness mediated by manufacturers' perceived social capital. The regression equations in this part are listed as the following:

- $\text{Perceptional trustworthiness} = i_1 + \text{c (relational capital)} + e_1,$
- $\text{Perceptional trustworthiness} = i_2 + \text{c}'(relational\ capital) + b(perceived\ social\ capital) + e_2,$
- $\text{Perceived social capital} = i_3 + \text{a (relational capital)} + e_3,$

where c is the coefficient relating relational capital and perceptional trustworthiness, c' is the coefficient relating the relational capital to perceptional trustworthiness adjusted for perceived social capital, b is the coefficient relating perceived social capital to perceptional trustworthiness adjusted for the relational capital, a is the coefficient relating relational capital to perceived social capital, $i_1$, $i_2$, and $i_3$ are

intercepts, $e_1, e_2$, and $e_3$ are residuals.

The results (see Table 5.10 and Table 11) indicate that perceived social capital fully mediates between social capital and manufacturers' perceptions of retailers' opportunistic behaviour. Consequently, H1(a) is supported. Since trust is a critical aspect of social capital, manufacturers are less likely to suspect their business partners' integrity with high relational capital. Cognitive capital, which consists of common business visions and goals, does not have the same level of direct association with integrity and trustworthiness as relational capital, which explains the lack of support for H1(b).

| R Square | Adjusted R Square | F | df1 | df2 | p |
|---|---|---|---|---|---|
| .186 | .182 | 42.081 | 2.000 | 368.000 | .000 |

*a. Predictors: (Constant), Relational*

**Table 5. 10** Model summary for DV model in mediation analysis – H1

| | Constant | B | Std. Error | t | p | Sobel p-value |
|---|---|---|---|---|---|---|
| **Path a** | 4.039 | .092 | .045 | 2.038 | .042 | 0.046 |
| **Path b** | 1.436 | .406 | .046 | 8.903 | .000 | |
| **Path c** | 2.907 | .088 | .044 | 2.009 | .045 | |
| **Path c'** | 1.268 | .050 | .040 | 1.260 | .208 | |

*Note:*
*Path a: relational capital to perceived social capital*
*Path b: perceived social capital to perceptional trustworthiness;*
*Path c: total effect of relational capital on perceptional trustworthiness;*
*Path c': direct effect of relational capital on perceptional trustworthiness;*

| | | B | Std. Error | t | p | Sobel p-value |
|---|---|---|---|---|---|---|
| **Path a** | (Constant) | 4.039 | .192 | 21.046 | .000 | .046 |
| | Relational capital | .092 | .045 | 2.038 | .042 | |
| **Path b** | (Constant) | 1.436 | .211 | 6.820 | .000 | |
| | Perceived social capital | .406 | .046 | 8.903 | .000 | |
| **Path c** | (Constant) | 2.907 | .185 | 15.713 | .000 | |
| | Relational capital | .088 | .044 | 2.009 | .045 | |
| **Path c'** | (Constant) | 1.268 | .249 | 5.086 | .000 | |
| | Relational capital | .050 | .040 | 1.260 | .208 | |

*Note:*

*Path a: relational capital to perceived social capital*
*Path b: perceived social capital to perceptional trustworthiness;*
*Path c: total effect of relational capital on perceptional trustworthiness;*
*Path c': direct effect of relational capital on perceptional trustworthiness.*

**Table 5. 11** Analysis of social capital's influence on perception of opportunistic behaviour through perceived social capital

Therefore, the regression equation of the mediation analysis can be depicted as the following:

- $\text{Perceptional trustworthiness} = 2.907 + .088\ (\text{relational capital}) + e_1,$
- $\text{Perceptional trustworthiness} = 1.268 + .050\ (relational\ capital) + .406(perceived\ social\ capital) + e_2,$
- $\text{Perceived social capital} = 4.039 + .092\ (\text{relational capital}) + e_3,$

H2 depicts product substitution as a moderator between social capital and the retailer's perceptional trustworthiness. Firstly, perceived social capital and product substitution are introduced as independent variables in a regression analysis. These variables account for a significant amount of variance in subjects' perceptions of the retailers' trustworthiness, $R^2$=0.21, F(2, 368) = 50.25, p < .001. Then, the interaction term between perceived social capital and product substitution is added to the regression model, which accounts for a significant proportion of the variance in subjects' perceptions of opportunistic behaviour, $\Delta R^2$ = .01, ΔF(1, 367) =4.25, p = .04. The regression equation can be depicted as:

- $\text{Perceptional trustworthiness} = 1.210 + .539\ (\text{perceived social capital}) + .718(\text{product substitution}) - .112(\text{perceived social capital} * \text{product substitution}) + e_4$

Table 5.12 displays statistical results that support H2.

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | (Constant) | 1.210 | .324 | | 3.734 | .000 |
| | Perceived social capital | .539 | .071 | .559 | 7.559 | .000 |
| | Product substitution | .718 | .211 | .407 | 3.397 | .001 |
| | Perceived social capital X Product substitution | -.112 | .054 | -.267 | -2.061 | .040 |

a. dependent variable: Perceived trustworthiness

**Table 5. 12** Analysis of product substitution as a moderator

As shown in Figure 5.2, product substitution imposes a negative influence over the relationship between social capital and perceptional trustworthiness of a retailer. The attenuation is stronger when the degree of product substitution is higher. When perceived social capital falls, the values of perceived opportunistic behaviour converge. As the perceived social capital increases, subjects' perceptions of trustworthiness towards the retailer decrease and are gradually dispersed across different product substitution levels. The reduction in subjects' perceptions of trustworthiness towards the retailer is becoming milder in the sequence of no, perfect, and unknown substitution. Therefore, product substitution is weakening the relationship between social capital and subjects' perceptions of trustworthiness towards the retailer. The explanation of this outcome corresponds with that of H3, implying that the ambiguity aversion is the major cause of the participants' overestimation of unknown potential competition.

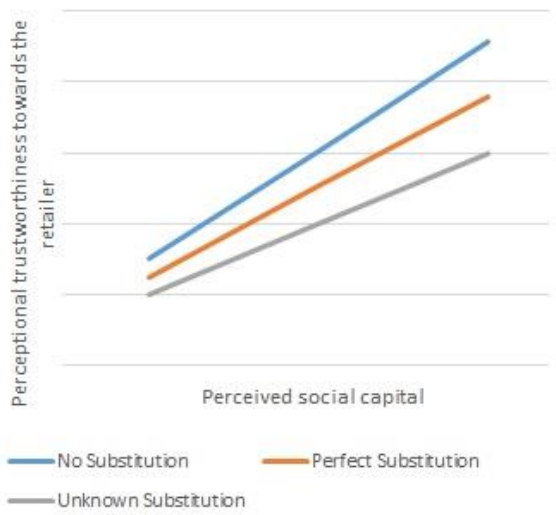


Figure 5. 2 Perceptional trustworthiness under the influence of social capital and product substitution

Hypothesis 3 has been tested in Section 5.3.

The relationship between a manufacturer's performance and their perceptions of the retailers' trustworthiness is proposed in H4. The manufacturer would suffer from a decline in performance if they perceive their retailers to be deceitful while in fact they are trustworthy, and vice versa. The results support H4. Since deviation from the optimal decision is measured, the opposite number is taken to indicate performance (Performance = 0 - deviation). When the deviation is large, the opposite number is low, indicating poor performance. When the retailer is not trustworthy, higher perceptional trustworthiness leads to lower performance (B = -22.216 SE = 5.538, t = -4.012, p < .001). The regression equation is

- $\text{Performance} = -105.204 \ - 22.216 \text{ (perceptional trustworthiness)} + e_5$

When the retailer behaves within ethical boundaries and provides reliable information, higher perceptional trustworthiness leads to higher performance (B = 22.674, SE = 5.251, t = 4.318, p < .001). The regression equation is

- $\text{Performance} = -332.845 + 22.674 \text{ (perceptional trustworthiness)} + e_6$

H5 proposes that manufacturers' perceptions of retailers' trustworthiness fully mediate the relationship between social capital and performance, regardless of the retailers' integrity. This hypothesis is tested under both conditions of untrustworthy and trustworthy retailers. This outcome (see Table 5.13 and Table 5.14) is consistent with full mediation and provides support for H5 under both conditions. When the retailer is untrustworthy, the regression equations are:

- $\text{Performance} = -135.055 - 9.621 \text{ (perceived social capital)} + e_7$
- $\text{Performance} = -103.507 - \ .574\text{(perceived social capital)} - 22.216 \ (p\text{erceptional trustworthiness}) + e_8$

- Perceptional trustworthiness
  $= 1.436 + .412\ (\text{perceived social capital}) + e_9$

When the retailer is trustworthy, the regression equations are:

- $\text{Performance} = -300.281 + 9.343\ (\text{perceived social capital}) + e_{10}$

- $\text{Performance} = -135.055 + .002(\text{perceived social capital}) +$
  $22.674\ (p\text{erceptional trustworthiness}) + e_{11}$

- Perceptional trustworthiness
  $= 1.436 + .412\ (\text{perceived social capital}) + e_9$

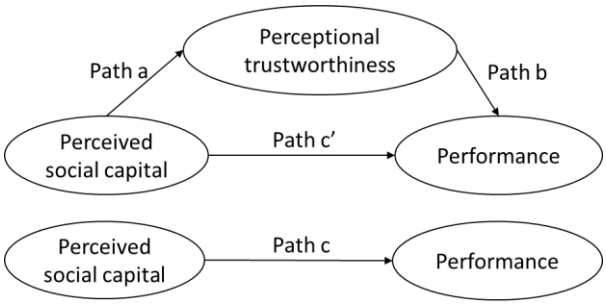


Figure 5. 3 Perceptional trustworthiness as a mediator between social capital and performance

| Model | R Square | Adjusted R Square | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| 1 | .042 | .037 | 8.030 | 2.000 | 368.000 | .0004 |
| 2 | .048 | .043 | 9.296 | 2.000 | 368.000 | .0001 |

*Note:*
*Model 1: retailers being untrustworthy; Model 2: retailers being trustworthy.*

**Table 5. 13** Model summary for DV model in mediation analysis – H5

| Model | | | B | Std. Error | t | p | Sobel p-value |
|---|---|---|---|---|---|---|---|
| **1** | **Path a** | (Constant) | 1.436 | .211 | 6.820 | .000 | .000 |
| | | Perceived social capital | .412 | .045 | 9.080 | .000 | |
| | **Path b** | (Constant) | -105.204 | 19.662 | -5.351 | .000 | |
| | | Perceptional trustworthiness | -22.216 | 5.538 | -4.012 | .000 | |
| | **Path c** | (Constant) | -135.055 | 25.209 | -5.357 | .000 | |
| | | Perceived social capital | -9.621 | 5.431 | -1.772 | .077 | |
| | **Path c'** | (Constant) | -103.507 | 26.913 | -3.931 | .000 | |
| | | Perceived social capital | -.574 | 5.913 | -.097 | .923 | |
| **2** | **Path a** | (Constant) | 1.436 | .211 | 6.820 | .000 | .000 |

| | | | | | |
|---|---|---|---|---|---|
| | Perceived social capital | .412 | .045 | 9.080 | .000 |
| **Path b** | (Constant) | -332.845 | 18.645 | -17.852 | .000 |
| | Perceptional trustworthiness | 22.674 | 5.251 | 4.318 | .000 |
| **Path c** | (Constant) | -300.281 | 23.980 | -12.522 | .000 |
| | Perceived social capital | 9.343 | 5.166 | 1.808 | .071 |
| **Path c'** | (Constant) | -332.850 | 24.971 | -13.329 | .000 |
| | Perceived social capital | .002 | 5.607 | .000 | 1.000 |

*Note:*

*1. See Figure 5.3 for illustration for each path.*

*2. Model 1: retailers being untrustworthy; Model 2: retailers being trustworthy.*

**Table 5. 14** Analysis of social capital's influence on performance through perceptional trustworthiness

| **Model** | **Unstandardized Coefficients** | | **Standardized Coefficients** | **t** | **Sig.** |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| H6(a) | | | | | |
| (Constant) | -133.071 | 17.413 | | -7.642 | .000 |
| Perception bias | -25.965 | 6.523 | -.239 | -3.980 | .000 |
| Cognitive reflection | 10.278 | 14.897 | .063 | .690 | .491 |
| Perception bias X cognitive reflection | 5.416 | 5.380 | .098 | 1.007 | .315 |
| H6(b) | | | | | |
| (Constant) | -146.638 | 25.002 | | -5.865 | .000 |
| Perception bias | -28.352 | 6.221 | -.274 | -4.558 | .000 |
| Cognitive reflection | -41.685 | 20.505 | -.269 | -2.033 | .043 |
| Perception bias X cognitive reflection | 8.529 | 5.131 | .226 | 1.662 | .097 |
| *Note:* *H6 (a): retailers being untrustworthy; H6 (b): retailers being trustworthy.* | | | | | |

Table 5. 15 Analysis of cognitive reflection as a moderator

H6 depicts cognitive reflection as the moderator between the manufacturer's perception bias towards the retailer's trustworthiness and performance. The results (see Table 5.15) provide partial support for H6. The regression equation is:

$$\begin{aligned}\text{Peformance} = &-146.638 - 28.352\ (\text{perception bias})\\ &- 41.685\ (\text{cognitive reflection})\\ &+ 8.529\ (\text{perception bias} * \text{cognitive reflection}) + e_{12}\end{aligned}$$

When the retailer is trustworthy, the cognitive reflection of the manufacturer attenuates the relationship between the perception bias and performance. In the

context of trustworthy retailers, as perceptional trustworthiness hurts performance, cognitive reflection tends to correct such bias and therefore weakens the negative association between perception bias and performance (Figure 5.4).

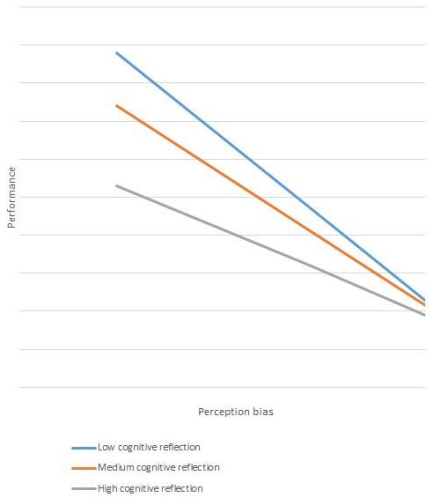


**Figure 5. 4** Cognitive reflection as a moderator between perception bias and performance

## 5.5 Reference matrix

In the previous section, we have identified relational capital as the most influential dimension of social capital in shaping participants' perceptions of their retailers' trustworthiness, as well as the ambiguity aversion of participants' when forming such perceptions. Thus, we further label relational capital into two levels (high/low) and compare perceptions along the degrees of product substitution (see Figure 5.5).

| | | **Product Substitution Level** | | |
|---|---|---|---|---|
| | | No(Group 1) | Perfect(Group 2) | Unknown(Group 3) |
| **Relational Capital** | Low | Low (Mean = 3.36) | Low (Mean = 3.18) | Low (Mean = 2.80) |
| | High | High (Mean = 3.94) | Low (Mean = 3.29) | Low (Mean = 2.98) |

**Figure 5. 5** Perception matrix

Observed perceptional trustworthiness is expected to descend as the substitutional level ascends. However, this value is lowest in the no substitution setting (Group 1) and reaches its peak when the substitution level between private label and national

brand products is not clear (Group 3). The contradiction between expectation and observation can be explained by ambiguity aversion, which drives the participants to overreact and make decisions beyond the worst case scenario (perfect substitution). Participants perceive uncertainty in an even more negative sense compared to the worst case scenario.

The perception of retailers' trustworthiness does not differ significantly when relational capital is low. In this setting, participants perceive retailers to be untrustworthy regardless of the product substitution level between private label and national brand products. The recorded perceptional trustworthiness levels from all three groups do not differ drastically; on the contrary, different levels of product substitution matter in developing manufacturers' perceptions of retailers' trustworthiness. Perceptional trustworthiness displays a significant difference among the groups when relational capital is high. Since trust is considered as a critical aspect of relational capital, participants believe they can trust their business partners in this setting. When a private label is introduced, they make their judgement on the retailer's trustworthiness based on the product substitution between this private label and the national brands. When substitution level is high (Group 2) or perceived to be high (Group 3), perceptional trustworthiness is observed to be low in both groups. Perceptional trustworthiness is observed to be significantly higher in Group 1, where private labels and national brands cannot be substituted at all. Therefore, the moderating role of product substitution is dependent on the strength of relational capital between the two supply chain partners.

## 5.6 Conclusion

This chapter has described the results of the data analysis of the online experiment responses. The effectiveness of the treatment is first examined. According to the outcomes, the introduction of the private label explains the drop in the retailer's perceptional trustworthiness regardless of the product substitution level between the private label and national brand products. The decrease in the retailer's perceptional

trustworthiness is most severe when the substitution level is unknown to the subjects. The hypotheses that have been proposed in Chapter Three have also been tested. Quantitatively, only the relational dimension of social capital has been found to influence the manufacturer's perception of the retailer's trustworthiness. According to the analysis outcomes, correct judgement is found to enhance the manufacturer's performance, while perception bias towards the retailer's perceptional trustworthiness causes loss. The role of cognitive reflection in judging perceptional trustworthiness is found to be effective only when the retailer is indeed trustworthy.

Essentially, this chapter provides basic statistical results which will be explained in the next chapter. Chapter Six provides the results of the hypotheses testing, an in-depth discussion of the main findings of this study, as well as the reflection on this study.

# CHAPTER 6 CONCLUSIONS

## 6.1 Introduction

This study has been conducted to investigate manufacturers' decision making behaviour under the influence of vertical competition imposed by the introduction of private labels by retailers. The thesis presents five chapters. The first chapter introduces the research background and stresses the need for a focus on supply chain vertical competition. This chapter also addresses the research gap by raising the research question, which is overdue in modern supply chains with vertical competition. Next, it explains the relevance of social capital theory and highlights its role as a double-edged sword in supply chain relationships. This chapter closes with a brief introduction of research design and an outline of this thesis. The second chapter presents a literature review on key factors in the research question. These factors are connected in the way that the manufacturer evaluates his/her retailer based on the social capital accumulation between them to adjust production decision making, which is under the influence of individual cognitive abilities. This chapter starts with a brief review on the origin and key development of social capital theory, which depicts the relationship among actors and the resources that are embedded in these relationships. Subsequently, it further explains the application of social capital theory in supply chain management. Ethical concerns, private label products, production decision making and cognitive reflection are also reviewed to support the theoretical model proposed in Chapter Three. The third chapter includes hypotheses to be tested as well as proper justification.

The fourth chapter introduces the research methodology; it presents the rationale for the experiment design, measurement tool development and data collection methods in detail with adequate justification. Chapter Five provides data analysis and interpretation of the results to examine whether the hypotheses are supported or rejected on an empirical basis. This chapter aims to provide a discussion of the results

generated in the last chapter and to reflect on the results with respect to the relevant studies and theories that have been reviewed in the previous chapters.

## 6.2 Main findings and discussion

The purpose of this study is to reveal how social capital affects manufacturers' perceptions of their retailers and the consequential performance under the influence of private labels. A conceptual framework has been proposed to connect social capital, perception/judgement, private labels, and performance. Through the construction of this model, this thesis has integrated theories across disciplines to clarify the judgement under vertical competition and its consequential outcome. The results of this study contribute to a more insightful understanding of the way in which performance is influenced by social capital, potential business threats, and decision makers' individual cognitive abilities.

Although social capital reduces opportunism and conflicts, it also provides opportunities for opportunistic activities. The first part of this study explains whether the perception of opportunistic activity rises with such opportunities when there is a possibility of competition. To recap, the structural, relational, and cognitive dimensions of social capital support high-quality information sharing and suppress opportunism in their respective ways. Structural capital provides infrastructure for resource exchange with direct and indirect contacts realised through social interactions in social networks. Relational capital encourages smooth information exchange and open communication through trust, obligations, respect, and friendship (Nahapiet and Ghoshal, 1998, Liao et al., 2011). Cognitive capital encourages information exchange that suits business goals better in term of both giving and receiving. It also suppresses deceitful activities by restraining inter-firm rivalry (Park and Ungson, 2001). H1 proposes a positive relationship between social capital the perceptional trustworthiness. Statistically, H1 is partially supported as a significant positive relationship is observed only between relational capital and the retailer's perceptional trustworthiness. However, it does echo a specific branch of studies

which identifies relational capital (usually in the form of trust) as the most frequently discussed and influential antecedent to effective information sharing (Cheng et al., 2008, Cai et al., 2010, Wu et al., 2014). With regard to this finding, it is important to point out that only through building relational capital could one directly eliminate suspicion and doubts among business partners.

Considering the nature of structural and cognitive social capital, it is within expectation that structural and cognitive capital do not directly associate with the manufacturer's perception of the retailer's trustworthiness because of the interrelationships among the three dimensions of social capital (Cousins et al., 2006, Lee, 2009, Bernardes, 2010, Li et al., 2014, Yim and Leem, 2013, Preston et al., 2017). Regarded as the infrastructure of resource exchange, structural capital is not as regularly highlighted as the other two dimensions in suppressing opportunistic behaviours and enhancing trustworthiness directly. Instead, it regulates actors' behaviour through other dimensions. It only provides occasion and opportunity for firms to interact and cultivate social capital on the two other dimensions. Such an opportunity does not guarantee that the social interactions facilitated by social network embeddedness will have a positive outcome. Therefore, the lack of direct influence on social interaction outcomes explains the rejection of H1 (c). Since a manufacturer relies on a retailer's forecast information to make better operational decisions, any inaccurate or distorted information might be harmful. Goal congruity, as a major aspect of cognitive capital (Inkpen and Tsang, 2005), ensures the information flow in this process will be conducted out of goodwill. However, the introduction of private labels, regardless of their substitution degree, is viewed as a sign of competition. Such competition indicates the conflicting interests and incongruity in business goals, which reduces the previously accumulated cognitive capital. Thus, the rejection of H1 (b) is understandable.

In addition, we have also explored the role of product substitution as a moderator of the association between social capital and perceptional trustworthiness. It is

proposed to impose a negative influence on this relationship. H2 is supported, which is consistent with our hypothesis because higher product substitution indicates more intense vertical competition and a higher likelihood of opportunistic actions. This finding can also be supported and explained by the actor-observer effect (Grissom et al., 2015) whereby manufacturers are inclined to attribute events to the retailer's opportunistic intentions (internal attribution) to gain a competitive advantage instead of a competitive business environment (external attribution).

The introduction of private label products weakens the relationship between social capital (in this case, mostly relational capital) and perceptional trustworthiness. The manufacturer does not trust the retailers as much as before. In other words, the perception of a certain retailer's trustworthiness is lower than before. Therefore, it is reasonable to infer that trust and trustworthiness are closely related; one cannot discuss one without the other. Özer and Zheng (2017) attach the concept of "vulnerability" to the concept of "trust". By trusting the retailer in sharing helpful information, the manufacturer exposes its vulnerability to this retailer as this retailer's information could be distorted and inaccurate. The launch of the private label makes the manufacturer feel insecure about the exposure to vulnerability. Such insecurity is even stronger when the product substitution degree is unknown. As explained by Özer and Zheng (2017), trust is a volatile concept under the impacts of uncertainties, vulnerabilities, and expectations, while trustworthiness is relatively more stable and innate.

Apart from the effects of social capital on the manufacturer's perception of the retailer's trustworthiness, this study also further demonstrates the possible outcomes of such perceptions under two different circumstances. Our investigation complements the branch of studies into the cause of the deviation from optimal ordering quantity by introducing ethical concerns. Perception regarding retailer integrity is a double-edged sword and drives performance in different directions under different circumstances. High perceptional trustworthiness improves the

manufacturer's performance when this retailer is dishonest, and such a perception will also impede performance when this retailer is frank and trustworthy. Although extra caution will mitigate the risks of opportunistic behaviour, unnecessary suspicion can hamper performance by exaggerating the seriousness of a potential threat. Sufficient literature has suggested both direct and indirect links between trust and performance (Li et al., 2014, Son et al., 2016), however, these studies are based on a premise that all the business participants are trustworthy and act within the expected moral norms. Our study acknowledges the "dark side" propose by Villena et al. (2011), and complements the mechanism through which relational capital makes a difference to performance.

We investigate the individual difference in cognitive abilities and provide empirical analysis that cognitive reflection moderates the impact of perceptional trustworthiness on performance. The results provide partial support for H6, which states that cognitive reflection weakens the relationship between the manufacturer's perception and its performance only when the retailer is honest and trustworthy. This finding is consistent with previous findings that individuals with higher cognitive reflection would be inclined to make decisions/judgements based on calculation instead of intuitions (Frederick, 2005, Toplak et al., 2011). However, moderation does not exist when retailers are acting opportunistically. One possible explanation is the limitation of CRTs proposed by Corgnet et al. (2016) that such tests predicts people's trusting behaviour but not trustworthy behaviour. Although more reflective people are more likely to trust, whether cognitive reflection indicates the ability to distinguish truth falsehood is questionable. The lack of dependable information sources makes it difficult to make a reasonable inference.

## 6.3 Managerial implications

What should you do when your business partner introduces a potential threat? This study sets out from examining the inter-organisational relationship, derived perceptions of business partners' integrity, and analyses the consequential influences

over performance. It has recruited 371 people in an SBRP experiment and collected their responses for data comparison and analysis. The study has been conducted in a context where a retailer has launched store brands and adjusted its usual order from its manufacturer. The outcome indicates the following implications for managerial practice that deserve further consideration.

First, the awareness of building social capital with an emphasis on the relational dimension should be raised among supply chain managers because our results reveal the critical role of relational capital in suppressing business partners' concerns regarding opportunistic information sharing behaviour. We suggest the retailers recognise this phenomenon and take preventive measures when making a progressive move.

Second, we reinforce the idea of effective communication. Retailers should realise that while doubts induced by the introduction of the private label cannot be completely offset by high relational capital, they can be controlled by a transparent communication mechanism. A lack of information triggers ambiguity aversion, resulting in fear, tension, and loss in relational capital. Our results show that the greatest change in perception exists in the group where participants were informed that the degree of substitution was uncertain. We therefore argue that companies, especially retailers, should update the current communication protocol to a more effective and transparent mechanism in order to reduce information asymmetry. Though sharing information about the harmless new launch may not be relevant, it helps ease business partners' concerns and will also cultivate social capital in return.

Thirdly, we shed light on the coping solutions to the launch of private labels from the perspective of manufacturers. Relational capital works as a prerequisite of private label moderation, the strength of which depends on the strength of relational capital between two supply chain partners. When relational capital is high, whether to cooperate or compete with retailers depends on the degree of substitution between national brands and the newly launched private label. When substitution level is high,

both parties should keep alert of and prepare for the possible upcoming competition. When substitution level is low, both parties should maintain their cooperative relationship as before and the introduction of private labels should not interfere with the usual production planning and scheduling. In contrast, when relational capital is low, trust does not exist. The manufacturer must always prepare for the potential competition regardless of the substitutional level of private label products.

Regardless of these suggestions, managers should always be aware that some problems cannot be solved by investing in inter-organisational relationships or enhancing communication effectiveness and efficiency. It is crucial to keep alert for signs of vicious competition, especially from their business partners. Information from a source low in social capital should be verified and compared with that from the source of higher social capital. If a mismatch between the two sources is identified, we contend that manufacturers are supposed to adjust their business strategies for possible upcoming competition.

## 6.4 Contribution of this study

This study extends supply chain management literature by offering empirical evidence that reveals the way social capital interacts with private labels and adjusts decision makers' behaviour accordingly. The study makes contributions to the literature on the following fronts.

Firstly, this study benefits social capital literature that features perceptional trustworthiness. In particular, one contribution of this study lies in the fact that it reveals the most influential dimension of social capital in mitigating manufacturers' perceptions regarding retailers' trustworthiness. Although previous studies have highlighted trust and trustworthiness as critical aspects of relational capital (Adler and Kwon, 2002), this study extends our understanding of social capital theory to contexts where the buyer-supplier relationship faces potential vertical competition. Among three dimensions of social capital, relational capital is the only one with the requisite

value to both ease business partners' suspicion and to enhance one's trustworthiness.

Secondly, this study contributes to our understanding of private labels by depicting and quantifying their moderating role between social capital and perceptions towards business partners. Such moderation is strongest when the degree of product substitution between national brands and the private labels remains unknown. This study addresses the negative outcome introduced by ambiguity in the interactions between manufacturers and retailers. The ambiguity aversion of subjects explains the irrational decision making induced by panicking, which drives them to act beyond the worst case scenario.

Thirdly, this study enriches our understanding of decision bias from the perspective of shortcomings in individual cognitive ability. Moritz (2009) has determined that individuals with higher cognitive reflection tend to make better production decisions. This study further explores the role of cognitive reflection under two separate conditions in detail. From the results, it is evident that individual cognitive reflection moderates the association between perceptional trustworthiness and its consequential performance in production decisions only when the retailer is honest and trustworthy. Under such circumstances, individuals with higher cognitive reflection are able to correct intuitive judgements with more precise reasoning and consequently generate decisions of higher quality. This implies that cognitive reflection does not reflect the ability to distinguish truth from falsehood, and that a reasonable decision relies on both reliable information sources and adequate reasoning abilities.

## 6.5 Limitations and future direction

To avoid inadequate comprehension of the research results, it is important and beneficial to reflect on the design and conduction of this study. This study has several limitations that can be interpreted in the following ways.

Firstly, the differences among industries or product categories are not discussed in

this study. In this study, chocolate is used as an example to illustrate the situation, where the newly launched private label from the retailer is likely to be a threat to national brand products. Chocolate consumption is highly versatile throughout the year. A great portion of yearly consumption happens around the Valentine's Day, Easter and Christmas holiday periods. Therefore, the results in this study are not applicable to product categories in which product demand remains relatively stable.

The second limitation is interpreted from the perspective of methodological design. This study adopts both within-subject and between-subject experimental designs. Although certain measures have been taken to minimise such influence, for example, attention checking questions and simplified version of the vignette, the results might be affected by fatigued subjects and practice effects. Furthermore, potential CMV inherent in this design should be recognised. As suggested by Podsakoff et al. (2003), CMV can be controlled by collecting independent variables and dependent variables from different contexts. However, this technique is not perfectly applicable in this study. In this study, independent variables (three dimensions of social capital) are embedded in the experimental vignette, while the dependent variable (perceptional trustworthiness) is generated by the experimental subjects. As suggested by Rungtusanatham et al. (2011), correspondence between cued levels of factors of interest and participants' perceived levels of these factors has been examined. The values of the dependent variable are generated by the subjects based on their impression of the cued independent variables. Therefore, it is inevitable that both perceived social capital and perceptional trustworthiness are collected from the same source.

The third limitation lies in the concept of opportunistic actions, which is considered as a reflection of perceptional trustworthiness. The set of actions was proposed by Carter (2000a), who has interviewed U.S. purchasing managers and their non-U.S. suppliers. However, the topic of ethics is deeply rooted in the cultural background. What is considered to be malicious in one culture might be acceptable in another.

Therefore, the results of this study are only applicable in similar cultures. Furthermore, social desirability is a potential limitation resulting from the discussion of opportunistic behaviour. A similar concern is also raised by Eckerd and Hill (2012), who advocate the use of firm-level questioning of individual subjects to reduce social desirability.

## 6.6 Recommendations for future research

This study mainly explains the influence of social capital over manufacturers' perceptions regarding their retailers' trustworthiness in the presence of potential vertical competition, as well as the consequential production decision making. Stemming from this study, there are several branches worthy of investigation in later studies. These research prospects are discussed in the following paragraphs.

The first branch of future studies lies in the diversity of product natures and their matching supply chains. Chocolate has been used as an example to help develop the experimental vignette, from which the findings have limited generalisability. Thus, supply chains with products of different natures are worthy of further exploration. According to the product characterisation proposed by Fisher (1997), functional products have stable, predictable demand and long life cycles, whereas innovative products have fluctuating and unpredictable levels of demand. The introductions of functional and innovative private labels would impose different impacts on decision making in supply chains. Since innovative products have relatively shorter life cycles, manufacturers have to maintain a steady stream of innovative products if their competitors imitate their products to steal their competitive advantage (Fisher, 1997). How manufacturers make product development decisions and production decisions remains unclear in this context. Furthermore, the difference between decision making in innovative product supply chains and functional product supply chains is also worthy of a more detailed investigation. Therefore, taking product characterisation into account when exploring the influence of private labels on a manufacturer's production decision making is particularly intriguing.

The second branch of future studies can be conducted by looking into different tiers of private label products. A three-tiered private label portfolio has become the mainstream strategy for retailers with private label products. Extant studies have explored the impacts of private labels on supply chains. The influences on perceptional trustworthiness and consequential production decisions imposed by the introduction of private label products depends on the tier of these product. The introduction of a private label product on a certain tier does not necessarily harm the sales of national brands. For example, the introduction of premium and economy private labels is sometime beneficial for national brands in terms of market share (Geyskens et al., 2010). Therefore, exploring how different tiers of private labels change manufacturers' perceptional trustworthiness and decision making can produce valuable insights.

The third branch of future studies lies in the opportunity to expand the boundaries of unethical behaviour defined in this research context. As has been discussed in the previous section, the unethical behaviour was originally proposed by Carter (2000a), who restrained the scope of unethical actions within American culture. Therefore, it is rewarding to address the cultural differences to inspire a richer understanding of social capital theory in decision making.

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# APPENDIX - Experiment vignette

**Perception measurement block 1**

Congratulations! You have just been appointed as the director in supply chain and operations department in your company. You cannot wait to make a difference. But wait… Let's focus on your very first task as a supply chain director.

You are in charge of a chocolate series, which is manufactured by your company and distributed across the nation for resale in many retail stores. As a director in supply chain and operations department, you should maintain good communications with retailers/distributors. Their information is very important for you to make critical decisions in your daily duties to manage production, stock and forecast. The information you receive from the retailers includes inventory level, sales data, order status, sales forecast, production/delivery schedule, and consumers' feedback of this product.

Faced with various data, complicated reports and unfamiliar retailers, you seem confused and a little…lost? Just when you are wondering what to do, you notice a file folder left by the previous supply chain director. It contains reports and charts about the interactions between your company and retailers. The brief is shown as the following, with 1-7 indicating how likely the description on the left side happens, based on actual situation.

| | 1.Extremely unlikely | 2.Moderately unlikely | 3.Slightly unlikely | 4.Neither likely nor unlikely | 5.Slightly likely | 6.Moderately likely | 7.Extremely likely |
|---|---|---|---|---|---|---|---|
| 1. Your company maintains frequent communication with this retailer through telephone, fax, visits and email. People from both companies enjoy spending time working and relaxing together (e.g. dining out). | | | | | | | |
| 2. This retailer is truthful and frank about information your company requires. Your company thinks this retailer is trustworthy, as it always keeps promises. | | | | | | | |
| 3. Your company shares similar business goals and vision with this retailer. Both companies always agree on what is in the best interest of the relationship. | | | | | | | |

(A set of parameters is shown in the table. Each participant has a unique set of parameters within the group)

Given the scenario, to what extent do you think this retailer would:

*Share insufficient information intentionally?*

*Share irrelevant information intentionally?*

*Mislead our company intentionally?*

*Delay sharing information intentionally?*

*Share obscure information intentionally to gain competitive advantage?*

*Exaggerate the seriousness of a problem, to gain more information than stated in contracts intentionally?*

**Newsvendor block 1**

(It is crucial to make your production decision based on your response in the last section and information given below. We have a mechanism to measure the consistency of your responses in this survey. At the end of this study, top 5% of the participants with highest consistency will receive additional 5 dollars as reward.)

There are two retailers in the city that resell chocolate from your company. One of them is the retailer mentioned above, the other is the only official retailing store of your company. Consumers' demand for chocolate fluctuates throughout different months of the year. Normally, total customer demand in a sales period would fluctuate around 5000. The first retailer normally orders 1800-2200 units of products from your company. But this time it only ordered 1600 units, which is much less than its previous orders. The official retailing store ordered 3000 units as usual.

If the retailer’s order truly reflected market demand for your product, your optimal production quantity would be 4643 units. If the retailer distorted the information about market demand, your optimal production quantity would be 5043.

Taken both your response in the last part and information above into consideration,

you decide to produce ____ units of chocolate in total for the next sales period.

Please note that:

*1. Delivery costs are not considered in this scenario. You can provide urgent deliveries in case of stock outs, as long as there is stock in your warehouse.*

*2. It is feasible to stock chocolate for possible urgent unplanned demand. But at the end of each sales period, unsold products are marked down at a price much lower than the cost to produce.*

**Treatment block – product substitution**

(One of the three descriptions will be displayed to one participant)

Recently this retailer has developed chocolate product series of its own brand, and launched this product into local markets. Customers have a preference towards your product, but it remains unsure that whether they are willing to buy this alternate product from this retailer when their preferred product is out of stock.

Recently this retailer has developed chocolate product series of its own brand, and launched this product into local markets. You notice that even if a customer has a preference towards your product, he is still willing to buy this alternate product from this retailer when his preferred product is out of stock.

Recently this retailer has developed chocolate product series of its own brand, and launched this product into local markets. You notice that when a customer has a preference towards your product, he is NOT willing to buy this alternate product from this retailer when his preferred product is out of stock. Such customers will turn to other store for your product.

**Perception measurement block 2**

Considering the description above, please evaluate the retailer's behavior based on

the same measurement again.

**Newsvendor block 2**

Please make the production decision again.

If the retailer’s order truly reflected market demand for your product, your optimal production quantity would be 4643 units. If the retailer distorted information to gain market share for its own brand from you, your optimal production quantity would be 5043.

Taken your perception of this retailer’s information sharing behaviour and the description about this retailer's substitute product into consideration, please indicate your ordering decision by sliding the bar below. Taken both your response in the last part and information above into consideration, you decide to produce ____ units of chocolate in total for the next sales period. (Please indicate your decision by dragging the bar below.)

## APPENDIX – Explanation of the variables and data analysis

When a participant finishes the experiment, a complete response should include the data in Table A. The calculation and meaning of the variables in hypotheses testing are displayed in Table B.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cognitive reflection test responses | $OP_1$ | $OP_2$ | $OP_3$ | $OP_4$ | $OP_5$ | $OP_6$ | OP7 | Order_Pre |
| | $OP_1'$ | $OP_2'$ | $OP_3'$ | $OP_4'$ | $OP_5'$ | $OP_6'$ | $OP_7'$ | Order_Post |
| | | | | | | | | *$OP_{1\text{-}7}$: opportunism in pre-test* |
| | | | | | | | | *$OP'_{1\text{-}7}$: opportunism in post-test* |

**Table A** A complete set of response

| Variables | Calculation/Meaning |
|---|---|
| $PT_{1\text{-}7}$ | Reversely coded from $OP_{1\text{-}7}$ |
| $PT'_{1\text{-}7}$ | Reversely coded from $OP'_{1\text{-}7}$ |
| PT | The mean of $PT_{1\text{-}7}$ |
| PT' | The mean of $PT'_{1\text{-}7}$ |
| X | X=PT-PT'; $X_1$, X2, $X_3$ represent the difference of perceptional trustworthiness before and after treatment in each group |
| PSC | Perceived social capital |
| PS | Product substitution, coded as 0,1,2 to represent no, perfect and unknown substitution |
| INT | INT= PS X PSC |
| PER1 | PER1 = ABS(Order_Post-2043); performance when the retailer is not trustworthy; when performance is better, the value is lower. |
| PER2 | PER2 = ABS(Order_Post-1643); performance when the retailer is not trustworthy; when performance is better, the value is lower. |
| CR | Number of correct responses in the cognitive reflection tests, ranging from 0-3 |
| PB1 | Perception bias when the retailer is not trustworthy; PB1 = ABS(PT'-1) |

| | |
|---|---|
| PB2 | Perception bias when the retailer is trustworthy; PB2=ABS(PT'-7) |
| INT1 | INT1=PB1 x CR |
| INT2 | INT2=PB2 x CR |

**Table B** List of variables for data analysis

The first step is to test the effectiveness of the treatment. In each group, paired-sample T-test is used to compare the difference between PT and PT'. Then we compare whether the difference between each pair is significant. This is how to test H3.

To test H1, correspondence between the cued and perceived social capital (PSC) should be checked. Perceived social capital is reflected by the subjects' judgements of the likelihood of the retailer's opportunistic behaviour/perceptional trustworthiness before the introduction of private label. Then we test whether PSC mediates between social capital and PT'.

To test H2, INT is the interaction term of perceived social capital and product substitution. In the test of treatment effectiveness, unknown substitution has the strongest impacts on subjects' perception change. Therefore, unknown substitution is coded as the highest. To test the moderation effect of product substitution, PS and PSC are firstly entered to predict PT'. Then PS, PSC and INT are used to predict PT' in a multiple regression.

To test H4, the deviation from optimal quantity from participant's response should be calculated (PER1 and PER2). Since performance is measured by deviation, lower value stands for better performance. When the retailer is not trustworthy, the actual demand is 2000, the optimal quantity should be 2043. Otherwise, the optimal quantity is 1643. Then under both circumstances, we run a simple regression analysis to test the relationship between PT' and performance.

H5 depicts PT' as the mediator between PSC and performance. Since performance is

calculated under two conditions, mediation should be tested twice with dependent variable being PER1 and PER2 respectively.

H6 tests the moderation role of cognitive reflection between PT' and performance. The predictors are PB1(2), CR, INT1(2), the dependent variable is PER1(2).