Dealing with Resource Disadvantage: Generic Strategies for SMEs

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ABSTRACT. This paper identifies three generic strategies for SMEs taking into account explicitly their resource disadvantage. In addition to the much advocated niching strategy, we show that SMEs can free-ride on the bigger firm's market development efforts and/or they can form strategic alliances to force accommodation by the bigger rivals. Contrary to conventional arguments, we show that success in niching is not conditional upon the continued ignorance of the niche by the bigger firms. It is also not true that the SMEs must have a cost advantage vis-à-vis the bigger firms in order to niche or to free-ride successfully. The bigger firms faced with entry into their markets by SMEs encounter the classical chain-store paradox. The three generic strategies proposed here are designed to force accommodation by the bigger firms.

1. Introduction

What may be small and medium enterprises (SMEs) today may well become tomorrow's major corporate institutions (Davis et al., 1985). With this view in mind, many countries have directed increased attention to the development and growth of SMEs. This is especially evident in the developing and newly industrialised economies where they are now looking towards their domestic SMEs to propel their countries' economic growth, which traditionally has been powered primarily by foreign investments.

Unfortunately, despite the widespread recognition of the important roles that SMEs play in the emerging economies, there has been relatively few formal research done on competitive strategies for SMEs, particularly those which explicitly recognise the resource constraints faced by the SMEs. This is an important issue because the lack of resources is very often cited as one of the major obstacles faced by SMEs (Weinrauch et al., 1991b and Eden et al., 1997). Existing literature on SMEs also tend to be descriptive, and prescriptive only to the extent of providing heuristics to guide the operations of SMEs. Although there are extensive works on competitive strategy in the strategic management literature, these do not take into account the impact of resource constraints on strategy formulation. Hence, their applicability to SMEs' strategic decision making is limited. For example, of the three generic strategies proposed by Porter (1980), it appears that only the "focus" strategy – concentrating on particular market segment(s), is applicable to SMEs given their limited resources. The interesting question here is whether there are any other strategy options available to SMEs, especially when they are competing against much bigger rivals endowed with plentiful resources.

This paper adopts a game theoretic approach to model the bigger firms' reactions to market entries by SMEs. We extend Selten's (1978) work on the "chain store paradox" to identify three generic strategies for SMEs. These are, (a) the niching strategy – filling market gaps by offering products differentiated from (but substitutable to) that of the bigger rivals', (b) the free-riding strategy – exploiting the market development efforts of the bigger rivals by offering products identical to theirs', and (c) forming strategic alliances to gain competitive advantages over the bigger rivals and/or to deter them from adopting aggressive competitive actions against the SMEs.

Of the three generic competitive strategies for SMEs identified in this paper, the niching strategy is perhaps the one most often advocated in the small business literature (see for example, Kao, 1981; Weinstein, 1994 and Kotler, 1996). When following the niching strategy, SMEs are advised to deliberately avoid direct competition with their

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bigger foes, given the resource limitations faced by the SMEs. This can be achieved by venturing overseas (Mascarenhas, 1986), and/or concentrating on market segments (or niches) which are currently ignored by their more resourceful rivals (Thompson and Strickland, 1996). However, these advice beget two very important and intriguing issues. First, why would the bigger rivals choose to ignore the niches targeted by the SMEs, especially if such niches can be profitably supplied by the SMEs? This behaviour by the bigger firms seems anomalous especially when niching has long been recognised as a very profitable option by most corporations. In fact, a survey of the Fortune 500 firms found that over 75% of these firms employ the niching strategy for at least some of their products (Linneman and Stanton, 1991).

Second, the advice to small firms to avoid direct competition with the bigger firms implicitly assumes that the bigger firm will surely react aggressively to entry by small firms into the former's market. An earlier empirical study by Cooper et al. (1986) however challenged this conventional thinking that SMEs should not meet larger competitors head-on, and supported the idea that bigger firms actually faced barriers that prevent them from reacting aggressively to the SMEs' entry into their markets. We extend Cooper et al. (1986) by providing a formal game-theoretic explanation as to why bigger firms would rationally choose to accommodate the entry of smaller firms into their market, under certain specified conditions – this is because it is more costly for the bigger firms to retaliate than to accommodate.

The issue of why certain market segments are ignored has been widely discussed in the literature (see for examples, Cooper and Kleinschmidt, 1987; Waterworth, 1987; and Ghemawat, 1991). Reasons given include anti-trust considerations, fear of self-cannibalisation (Ghemawat, 1991), small size of the niche (Weinrauch et al., 1991a) and low perceived potential of the niche. Furthermore, some authors had pointed out that one reason why the bigger firm might ignore a market niche is because it is locked into inefficient practices and hence, could not adapt to the demands of the market niche (Cooper et al., 1986). In such cases, the SME would have the upper hand as it is more willing and able to accommodate output flexibility (Fiegenbaum and Karnani, 1991), and is better sited to provide localised attention (Johnson, 1997).

The smallness of the niche now however is no guarantee that the bigger firm would always leave the niche to the SME. The bigger firms have been known to subsequently enter such small niches later when their potential are realised (Keiper, 1996). Conventional arguments on why the bigger firms choose to ignore the niches supplied by the SMEs usually rely on some form of irrationality on the part of the bigger firms (for example, see Ghemawat, 1991). In this paper, we propose an alternative explanation – the bigger firms make a rational decision to deliberately ignore the niches filled by the SMEs and to accommodate the entry of SMEs into their markets. Such a decision is taken because, just as the SMEs do not wish to engage in direct competition with the bigger firms, the latter are similarly motivated. Direct competition with the SMEs depresses prices not only in the market niches, but also in all other market segments which are currently supplied with substitutable products by the bigger firms. The loss in margins, and hence profits, to the bigger firms in these other segments can be sufficiently large such that they prefer to adopt a "live and let live" attitude towards the SMEs which choose to supply the market niches.

For successful niching, SMEs should supply products that are substitutable to that of their bigger rivals' instead of totally differentiated ones. The more substitutable the SMEs' products are to their bigger rivals', the greater their losses due to depressed margins to the bigger firms if they choose to compete aggressively in the niches supplied by the SMEs. This forces accommodation by the bigger firms. In the limit of substitutability, the SMEs can supply identical products to that of the bigger rivals and hence, free-ride on the latter's market development and promotions efforts. Although accommodation can cause the bigger rivals to lose some market shares, it may still be less costly than aggressively fighting the entry by the SMEs. We show that the niching and the free-riding strategies can be used successfully by the SMEs against their bigger rivals, even if the SMEs have a small cost disadvantage.

What happens when the bigger rivals choose to fight the SMEs' entry into their markets despite

the high cost of such actions? The bigger firms are willing to take such costly actions if they perceive that, by using their vast financial resources, there is a good chance that they would succeed in driving out the SMEs from their markets. Under such circumstances, we propose that SMEs should signal that they are committed to stay in the market, and that any aggressive competitive actions taken by the bigger rivals will only result in protracted competition to the detriment of all parties. In order for the signal to be credible, we suggest that SMEs form strategic alliances to overcome their disadvantages against their bigger rivals. The increase in resources and/or gain in competitive advantages, accruing from the strategic alliance serves to signal to the bigger rivals the SMEs' ability to defend their turf and their commitment to the market. This, therefore deters the bigger rivals from contemplating aggressive campaigns in the first place, and even forces them to accommodate the presence of the SMEs in their markets instead.

2. Literature review

In general there is a dearth of formal research on SMEs. In an earlier review of the literature on small businesses, Davis et al. (1985) conclude that scholarly research to improve our understanding of the marketing/small enterprise interface is nowhere to be found. Wortman (1987) echoes similar sentiments and laments that "there are no theories in the entrepreneurial field" (p. 264), while D'Amboise and Muldowney (1988) conclude that "knowledge about small business management is fragmented" (p. 226). Despite recognising the need and inspite of the repeated calls for theoretical works in the area of small business management, the lack of such works persisted.

The current literature on SMEs tends to be descriptive and focuses only on a few areas of investigation. For example, studies by Waterworth (1987), Scarborough and Zimmer (1991), and Bhide (1994) focus on the planning process of SMEs, providing an overview of the host of problems faced by SMEs and advice on strategic planning for SMEs. Works by Tarkenton and Boyett (1991) and Scarborough and Zimmer (1991), on the other hand, attempt to provide advice on the day-to-day operations of SMEs, covering the various functional areas. Some other authors, like Moore (1987), and Cook (1992), attempt to identify factors that are crucial to the success of SMEs. In the area of SMEs' marketing mix strategies, Waterworth (1987) and Paley (1989) discuss the applicability to SMEs of the 4Ps of marketing and the product life cycle concept respectively, while Williams (1990) and Gerson (1994) prescribe new sets of "Ps" for SMEs.

More directly related to our work are prior studies in the area of competitive strategies for SMEs. Various authors have recognised the importance of the niching or focus (Porter 1980) strategy to SMEs (see for example Kao (1981), Waterworth (1987), Kotler (1996) and Paley (1989)). In following the niching strategy, SMEs need to identify the appropriate market niche that is "attractive". In this regard, both Thompson and Strickland (1996) and Brown (1995) have provided criteria defining the attractiveness of potential niche markets for SMEs. However, all these works seem to imply that the niching strategy is the only competitive strategy option available to SMEs, given their lack of resources. In fact, Kao (1981), explicitly recognising the resource disadvantage faced by SMEs against bigger firms, argues that "if there is no niche or gap, there is no hope for the firm's survival and prosperity" (p. 62). While it is important for SMEs to niche, the crucial question here is whether this is the only strategy option available to SMEs (Lauenstein, 1986). In a later study, Greenfield (1989) suggested that Porter's 3 generic strategies could be adapted for application by SMEs.

One major limitation of all these studies on SMEs' competitive strategies is their failure to explicitly consider the competitive reactions of the bigger rivals to the SMEs' strategies, although the need to do so is well recognised (see for examples, Waterworth, 1987; Bennett, 1989; Jones, 1991; and Tarkenton and Boyett, 1991). In order to incorporate explicitly the competitive reactions of the bigger rivals, this paper utilises the game theoretic approach to formally derive three generic competitive strategies for SMEs, taking into account their resource disadvantage at the same time. Contrary to Kao's arguments (1981), we show that, even if there are no market gaps, SMEs

may still survive by free-riding on the efforts of the bigger rivals. In addition, contrary to Perry's suggestion (1987), we show that SMEs do not need to possess a cost advantage in order to adopt the niching strategy.

Though Lee and Tan (1993) also identify a set of generic competitive strategies for SMEs, their work is based on an interpretivistic approach, drawing on the wisdom of Sun Tzu's Art of War. A recent work by Ghemawat (1991) also follows the game theoretic approach in attempting to provide a rational explanation for the existence of market niches that are deliberately ignored by the bigger firms. In his view, the bigger firms avoid supplying the market niches (thus leaving market gaps for SMEs to move into) for fear of sales cannibalisation on the other market segments that are already supplied by them. This rationalisation seems strange because when faced with the problem of either lost sales due to cannibalisation or due to competition from the SMEs, surely the former is the more desirable of the two unattractive alternatives. Following Selten's view (1978), we argue instead that the bigger firms face the problem of the "chain store paradox". Hence, it can be optimal for the bigger rivals to accommodate the entry of the SMEs into the market gaps, if these are not already supplied by the bigger firms, and even into those market segments which are already supplied by the bigger firms. This is because the cost of aggressive retaliatory actions, if undertaken by the bigger firms against the SMEs, may far exceed the cost of accommodating the SMEs' presence in the market.

3. Model

We based our model on Selten's (1978), extending and adapting it to the context of a small/big firm rivalry. However, while Selten focuses on the market incumbent and his deterrent strategies, we concentrate on the entrant's (that is, the SME in our model) strategies for successful market penetration.

Consider a market M which consists of multiple market segments. Following conventional wisdom that given their resource limitations, SMEs should focus on select market niches, we consider the situation where a SME has identified a potentially attractive market segment, $s_j \in M$. The SME is contemplating whether or not it should enter the market to serve segment s_j. The market segment s_j may be one that is currently being ignored or one that is currently being served by a bigger firm. Being the incumbent supplier, the bigger firm already supplies some of the segments, $S = \{s_k\} \subseteq M$, $k = 1$ to n, in the market. Thus, the success of the SME in entering the market segment s_j will depend on the reactions of the bigger firm. Specifically, the bigger firm may choose to accommodate the entry of the SME, or it may choose to aggressively deter the SME's entry. In the latter case, if s_j is a market niche initially ignored by the bigger firm (that is, $s_j \notin S$), then it will attempt to capture the market niche from the SME by supplying a product similar to that offered by the SMEs. On the other hand, if s_j is already being supplied by the bigger firm (that is, $s_j \in S$), then it will attempt to defend its market aggressively against the entry of the SME. Figure 1 illustrates the rivalry between the SME and the bigger firm.

Let π_{S0} and π_{B0} be the payoffs to the SME and the bigger firm respectively at status quo; that is, before the SME enters the market. If the SME chooses to enter the market segment s_j and if the bigger firm chooses to compete aggressively, then they earn π_{S1} and π_{B1} respectively. However, if the bigger firm chooses to accommodate the entry of the SME, then π_{S2} and π_{B2} are the payoffs to the SME and the bigger firm respectively.

Let Q_j be the total demand in segment s_j, such that $Q_j = a_j + q_j(P_j) + \Sigma_k \Delta_{jk}$, where a_j is the exogenous demand from consumers, and $q_j(P_j)$ is the endogenous demand from consumers, which is dependent on the price levels P_j, in the segment s_j. Finally, $\Delta_{jk} = g(P_j, P_k)$ is the demand resulting from consumers in segment s_k switching to purchase the product supplied for segment s_j, and is endogenous on the relative price levels P_j and P_k in segments s_j and s_k respectively. Hence, $\Sigma_k \Delta_{jk}$, $k = 1$ to n, is the total effect of consumer switching as a result of the SME's entry into the market and supply of a product substitutable to that offered by the bigger firm.

We assume that $\Delta_{jk} = g(P_j, P_k)$ is convex and strictly decreasing in P_j, and is concave and strictly increasing in P_k. The former means that the rate of consumer switching from segment s_k decreases, at a reducing rate, with an increase in the price level P_j. Whereas, the latter means that

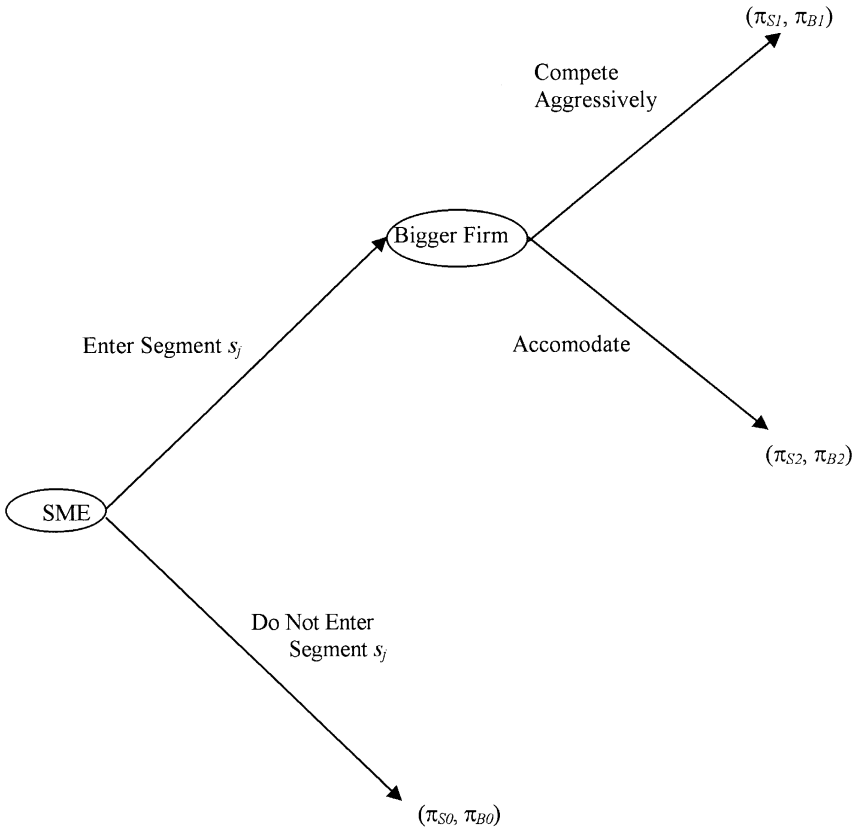

Figure 1. Game in extensive form of SME – bigger firm rivalry.

the rate of consumer switching increases, at a reducing rate, with an increase in the price level P_k. The level of substitutability between the product supplied by the SME for the segment s_j and that supplied by the bigger firm for segment s_k is thus defined by the curvatures of the function $g(P_j, P_k)$. Increasing degrees of convexity in P_j, and concavity in P_k, increases the level of substitutability, and hence the severity of consumer switching. Similarly, we assume that $q_j(P_j)$ have general functional forms in that $q_j(P_j)$ is convex and strictly decreasing in P_j. This implies that demand q_j from consumers in segment s_j decreases, at a reducing rate, with an increase in the price level P_j.

4. Analysis

We first investigate the scenario where a SME enters into a market niche initially ignored by the bigger firm. Next, we examine the case where a SME enters a market segment that is already being supplied by the bigger firm.

Market niche is ignored by the bigger firm ($s_j \notin S$)

When the SME enters into a market niche initially ignored by the bigger firm by supplying a substitutable product, the bigger firm will suffer a loss in sales due to consumer switching equal to $\Sigma_k \Delta_{jk}$, $k = 1$ to n, if it chooses to accommodate the SME's entry by doing absolutely nothing. In order to minimize the loss in sales, the bigger firm should adjust its price levels in the various segments that it supplies. In fact, the SME and the bigger firm face a Stackelberg type game for substitutable products, in which they are the leader and follower respectively. In the Stackelberg model, there is a first-mover advantage because the Stackelberg leader dictates the strategy decision variables, whereas the Stackelberg follower reacts by

adapting his strategy to the strategy adopted by the Stackelberg leader.

As the Stackelberg follower, the bigger firm's optimal price reaction to the SME's price is given by P_k^r = ArgMax. $\Sigma[P_k Q_k]|P_s$, k = 1 to n, where P_s is the SME's price for the product which it supplies to segment s_j. Hence, $P_j = P_s$ in this case. Knowing this, the SME thus charges the optimal price P_s^* = ArgMax. $P_s Q_j$ = Argmax. $P_s[a_j + q_j(P_s) + \Sigma_k \Delta_{jk}(P_j, P_k^r)]$. As a Stackelberg follower, the bigger firm therefore charges P_k^* = ArgMax. $\Sigma[P_k Q_k]|P_s^*$.

Let P_k^0, k = 1 to n, be the initial price levels for the various segments s_k supplied by the bigger firm. Hence, the bigger firm earns $\pi_{B0} = \Sigma_k[P_k^0 Q_k^0]$ before the entry of the SME into the market. While, it earns $\pi_{B2} = \Sigma_k[P_k^* Q_k^*]$ and suffers a sales cannibalization loss of $\Sigma_k \Delta_{jk}(P_s^*, P_k^*)$, if it accommodates the SME's entry into the market and chooses the optimal price reactions.

Lemma 1(a): $\pi_{B0} = \Sigma_k[P_k^0 Q_k^0] > \pi_{B2} = \Sigma_k[P_k^* Q_k^*]$

Lemma 1(b): $\pi_{S0} < \pi_{S2}$

Once the initially ignored market niche is observed to be profitably supplied by the SME, the bigger firm may be tempted to supply the same market niche and to compete aggressively against the SME. This can be done by introducing a product identical to that supplied by the SME and pricing it attractively to undercut the SME's price. Under this scenario, the price equilibrium is such that both firms charge $P_s^{**} = P_b^{**} = C$, where P_b^{**} is the bigger firm's price level in the segment s_j, if both have the same unit cost structure as defined by C. Otherwise, $P_s^{**} > P_b^{**} = (C - \varepsilon)$, if the bigger firm has a cost advantage over the SME, who has a unit cost structure defined by C. In this case, the bigger firm will exploit its cost advantage, charging a price P_b^{**} which undercuts the SME's price by a small amount ε in order to capture the market niche from the SME. Let α, $0 \le \alpha \le 1$, be the fraction of the market niche captured by the bigger firm if it chooses to compete aggressively against the entry of the SME. This would depend on factors like the pulling power of the bigger firm's brand equity, its reputation for product and/or service quality, its financial resources, its distribution network, and the competitive strengths of the SME. For the other segments which the bigger firm supplies, it will also optimally adjust its price levels to P_k^{**}, such that P_k^{**} = ArgMax. $\Sigma[P_k Q_k]|P_b^{**}$.

Lemma 2(a):

$\pi_{B2} = \Sigma_k[P_k^* Q_k^*] > \pi_{B1}$
$= (\Sigma_k[P_k^{**} Q_k^{**}] + \alpha P_b^{**} Q_j^{**})$,
if $(\Sigma_k[P_k^* Q_k^*] - \Sigma_k[P_k^{**} Q_k^{**}]) > \alpha P_b^{**} Q_j^{**}$.

Lemma 2(b): $\pi_{S2} > \pi_{S1} = \pi_{S0}$

Following the criteria for sub-game perfection, we can now derive the equilibrium strategies for the SME and the bigger firm, giving us Proposition 1.

Proposition 1:
When the SME follows the niching strategy, {Enter, Accommodate} is the Nash equilibrium with payoffs $\{\pi_{S2}, \pi_{B2}\}$, if $(\Sigma_k[P_k^* Q_k^*] - \Sigma_k[P_k^{**} Q_k^{**}]) > \alpha P_b^{**} Q_j^{**}$.

What this means is that, the bigger firm will accommodate the entry of the SME if the SME is supplying a product substitutable to that offered by the bigger firm. The reason for this is not because of the fear of sales cannibalization by the bigger firm per se, as claimed by Ghemawat (1992). Whether the bigger firm accommodates, or competes aggressively against, the entry of the SME, the bigger firm will still suffer lost sales, either to the SME or to sales cannibalization. It is the costs of aggressive competition which force the bigger firm to accommodate the entry of the SME into the market niche. These costs could be in terms of greater loss of margin in the other segments supplied by the bigger firm when it engages in a price war in the market niche. These costs may greatly outweigh the costs of accommodation which comprises lost sales and reduced market shares.

Proposition 2:
If the SME enters the market and supplies a totally differentiated product, then the Nash equilibrium for the bigger firm is to compete aggressively against the SME.

If the SME supplies a product which is totally

differentiated from that of the bigger firm's, then even if the bigger firm introduces a product identical to that offered by the SME and competes aggressively for same market niche, margins in the other market segments supplied by the bigger firm will not be affected. The costs of aggressive competition to the bigger firm will be thus minimized. The bigger firm will therefore not hesitate to introduce a product similar to that of the SME's and compete aggressively against the SME, once it observes that the market niche can be profitably supplied. Hence, contrary to conventional wisdom (see for example Weinrauch et al., 1991a), the SME should not offer too distinct a product offering, but one that is substitutable to that offered by the bigger firm.

Even though the product is totally differentiated from that currently offered by the bigger firm, the bigger firm will still have competitive advantages over the SME due to better financial and manpower resources and economies of scale and scope in advertising and distribution.

If the bigger firm fears negative spill-over effects on its reputation etc., arising from price competition in the totally differentiated product market, it could still enter the market via a separate business unit and/or different brand name. Not only would this move help minimise the negative effects on the parent company and/or existing product line, it also means that the new business unit could tap on the better financial resources and marketing expertise of the parent firm in competing against the SME.

Corollary 1:
In following the niching strategy, the SME should supply a product which is substitutable, instead of totally differentiated, to that offered by the bigger firm in order to force the bigger firm to accommodate its entry.

Proposition 1 holds even if the bigger firm enjoys a cost advantage over the SME, provided its cost advantage is not too substantial, nor the size of market niche too large, such that $\alpha P_b^{**} Q_j^{**} > (\Sigma_k[P_k^* Q_k^*] - \Sigma_k[P_k^{**} Q_k^{**}])$. This implies that, contrary to Perry's (1987) suggestion, even if the SME suffers a small cost disadvantage, it can still successfully follow the niching strategy if it supplies a product substitutable to that offered by the bigger firm. From Propositions 1 and 2, we have Corollary 2.

Corollary 2:
The SME does not need a cost advantage in order to force the bigger firm to accommodate its entry into the market niche, if the SME supplies a product that is substitutable to that offered by the bigger firm.

Market segment is supplied by the bigger firm ($s_j \in S$)

Suppose the SME follows the free-rider strategy by entering a market segment which is developed and supplied by the bigger firm, $s_j \in S$. The SME can capture a part of the market segment by supplying a product identical to that offered by the bigger firm, and undercutting its price by a small amount δ to charge $P_s = (P_b - \delta)$, in order to encourage consumer switching. Let α, $0 \leq \alpha < 1$, be the bigger firm's market share of segment s_j as a result of the SME's free-rider strategy. To counter the SME's entry, the bigger firm may choose to compete aggressively to recapture its market share by retaliating with a price cut. However, this initiates a price war. The resulting price equilibrium has $P_b^{**} \in \{C, C - \varepsilon\}$, given that both the SME and the bigger firm supply identical products. Otherwise, the bigger firm may choose to accommodate the SME's entry by doing nothing, in which case it suffers a market share loss from segment s_j of $(1 - \alpha)$. Let α^0 and α^{**} be the bigger firm's market share of segment s_j when it accommodates, and when it competes aggressively, respectively. Hence, if the bigger firm chooses to accommodate, it earns $\pi_{B2} = (\Sigma_k[P_k^0 Q_k^0] + \alpha^0 P_b^0 Q_j^0)$, $j \neq k$, which means that it loses market share, but price levels are maintained.

Lemma 3(a): $\pi_{B0} = (\Sigma_k[P_k^0 Q_k^0] + P_b^0 Q_j^0) > \pi_{B2} = (\Sigma_k[P_k^0 Q_k^0] + \alpha^0 P_b^0 Q_j^0)$, $j \neq k$.

Lemma 3(b): $\pi_{S0} < \pi_{S2}$.

Alternatively, if the bigger firm chooses to compete aggressively, it may recapture a portion of the market share, $\alpha^{**} > \alpha^0$, but at a cost of lower margins, $P_k^0 > P_k^{**}$, and $P_b^0 > P_b^{**}$, not only in the segment s_j, but in all the segments it

supplies. In this case, the bigger firm earns $\pi_{B1} = (\Sigma_k[P_k^{**}Q_k^{**}] + \alpha^{**}P_b^{**}Q_j^{**})$.

Lemma 4(a):

$\pi_{B2} = (\Sigma_k[P_k^0Q_k^0] + \alpha^0P_b^0Q_j^0) > \pi_{B1}$
$= (\Sigma_k[P_k^{**}Q_k^{**}] + \alpha^{**}P_b^{**}Q_j^{**})$, $j \neq k$,
if $(\Sigma_k[P_k^0Q_k^0] - \Sigma_k[P_k^{**}Q_k^{**}])$
$> (\alpha^{**}P_b^{**}Q_j^{**} - \alpha^0P_b^0Q_j^0)$.

Lemma 4(b): $\pi_{S2} > \pi_{S1} = \pi_{S0}$

As in the earlier case, when the SME follows a niching strategy, the bigger firm is better off accommodating the SME's entry into its market when the SME follows the free-riding strategy, unless it possesses a sufficiently large cost advantage such that $(\alpha^{**}P_b^{**}Q_j^{**} - \alpha^0P_b^0Q_j^0) > (\Sigma_k[P_k^0Q_k^0] - \Sigma_k[P_k^{**}Q_k^{**}])$.

Proposition 3:
When the SME follows the free-riding strategy, {Enter, Accommodate} is the Nash equilibrium with payoffs $\{\pi_{S2}, \pi_{B2}\}$, if $(\Sigma_k[P_k^0Q_k^0] - \Sigma_k[P_k^{**}Q_k^{**}]) > (\alpha^{**}P_b^{**}Q_j^{**} - \alpha^0P_b^0Q_j^0)$.

In an earlier paper, Kao (1981) argues that SMEs can survive only if there exist market gaps ignored by the bigger firms. Proposition 3 shows the contrary. Even if there are no market gaps, SMEs may still survive targeting market segment(s) currently supplied by the bigger firm, and free-riding on their efforts, by supplying products identical to that offered by the bigger firms and undercutting their prices. The key to successful market entry by the SMEs, in the face of competition from the much bigger rivals, lies in the SMEs' abilities to force these rivals to accommodate entry, instead of relying on these rivals' continued ignorance of profitable market niches. The use of the niching and the free-riding strategies, in which SMEs supply substitutable and identical products respectively, forces accommodation by the bigger rivals by increasing their costs of aggressive retaliations. This explains why the "follower strategy" advocated by Baker (1992) for SMEs can be successful, as in the case of parallel importing or gray marketing (Tan et al., 1997). This also explains why SMEs and the bigger firms can co-exist even when they are competing for the same markets, although the former face resource disadvantages. Increasing substitutability of the products supplied by the SMEs actually increases the costs of aggressive competitive actions to the bigger rivals, as the following proposition shows. Hence, the likelihood of accommodation by the bigger rivals increases with increasing product substitutability.

Proposition 4:
It is more costly for the bigger firm to compete aggressively against the SME's entry when the SME follows the free-rider strategy, than when it follows the niching strategy.

When the bigger firm chooses to fight the SME's entry

We have shown earlier that the bigger firm's rational response to the SME's entry into its market, in terms of profit maximization, is to accommodate, unless it possesses a sufficiently large cost advantage or the market niche involved is sufficiently large and profitable. However, there is also the possibility that the bigger firm may choose to "act crazy" (Selten, 1978) by choosing to compete aggressively against the SME's entry despite its realisation that the costs of doing so are exorbitant. This aggressive behaviour occurs if the bigger firm believes that it will forced the SME to exit from the market, and if it will help to establish a reputation for toughness to deter future entry by even more rivals into the market. Figure 2 shows the entry-exit game in extensive form of the SME-bigger firm rivalry.

Faced with such aggressive incumbents, it appears that there is little the SMEs can do to compete successfully against them, given their limited resources. For example, knowing that a SME is disadvantaged in resources, a bigger firm with deep pockets can intentionally initiate a severe price war that is costly to both parties. The bigger firm with abundant financial resources can easily outlast the SME with limited resources, forcing the latter to exit from the market.

Lemma 5: $\pi_{Se} > \pi_{S1}$.

However, if the SME can credibly commit to stay in the market, then the bigger rival may be deterred from taking aggressive actions against it

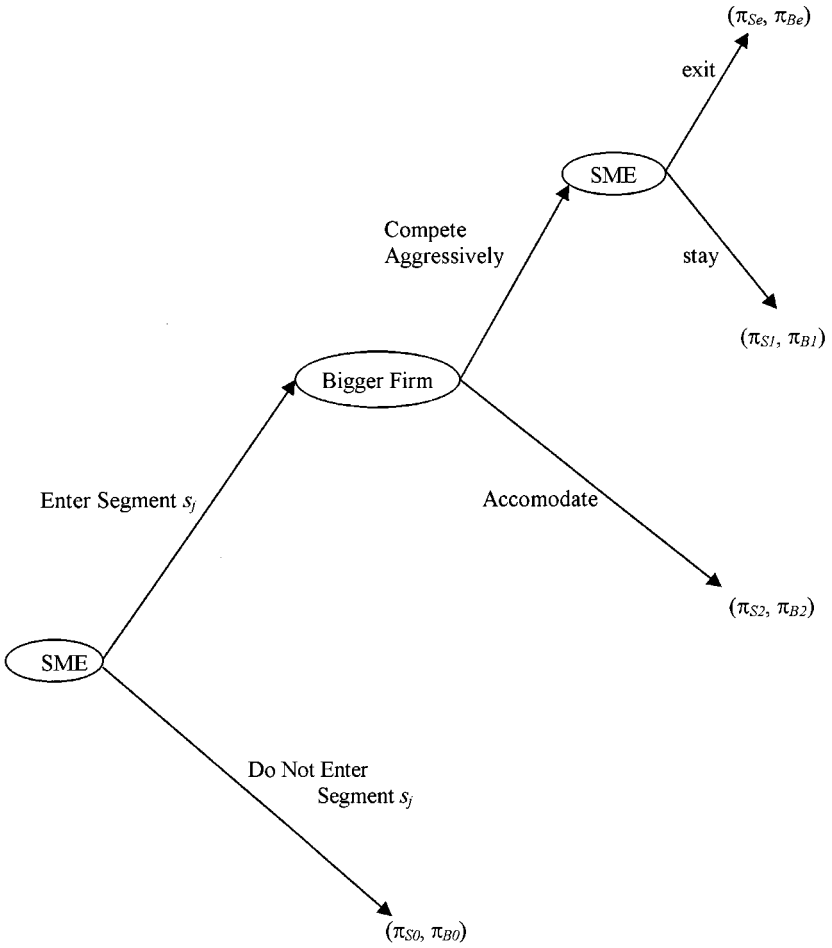

Figure 2. Entry-exit game in extensive form of SME – bigger firm rivalry.

in the first place. This is because such aggressive actions hurt the bigger firm as well, and if prolonged – due to the SME's commitment to stay in the market, the bigger firm is in fact much better off accommodating the entry of the SME into the market rather than trying to force its exit.

Proposition 5:
If the SME can credibly commit to stay in the market, then {Enter, Accommodate} is the Nash equilibrium.

In order for the SME to credibly signal its commitment to stay in the market, it must be able to survive against the aggressive actions taken by the bigger firm. To do so, the SME needs to overcome its resource limitations and other disadvantages vis-à-vis the bigger firm. For this purpose, we propose that the SME forms a strategic alliance with parties who possess the relevant strengths. The alliance will be in a better position to defend and survive against the aggressive actions taken by the bigger firm, and thus credibly commit its intention to stay in the market and defend its turf. This alliance will thus deter the bigger firm from adopting an aggressive stand, as the chances of success in forcing the alliance exit become remote. The purpose of strategic alliance formation proposed here is therefore to deter the bigger firm from taking aggressive actions in the first place, rather than to equip the SME to fight better.

Three generic strategies for SMEs

Our analyses identify several strategies for SMEs to compete against the bigger firms. The SME's choice of strategy depends on the anticipated behavior of the bigger rivals – whether they are aggressive or accommodating. These are as illustrated in Figure 3. If it is anticipated that the bigger firm is accommodating in that it will react rationally to the SME's entry, then the SME can employ the niching and/or the free-riding strategies. However, if it is anticipated that the bigger firm is aggressive in that it will "act crazy" (Selten, 1978) by choosing to compete aggressively despite the high costs, then the SME should preempt such aggression by forming a strategic alliance with other firms. This will deter the bigger firm from choosing to compete aggressively in the first place.

How do our three strategies compare with Porter's (1980) three generic strategies? The most important difference is that our analyses explicitly take into account the resource limitations faced by SMEs while this issue is not addressed in Porter's prescriptions. Porter's "Overall Cost Leadership" strategy requires a strategic advantage of low cost position and an industry wide coverage of the market. A pre-requisite to this strategy is the existence of economies of scale, which the SME is unlikely to possess (Nooteboom, 1993). Therefore, Porter's "Overall Cost Leadership" strategy may not be suitable for SMEs. Some of the commonly required skills and resources identified by Porter's "Differentiation" strategy are not easily satisfied by SMEs. For example, SMEs may not have the corporate reputation for quality or technological leadership, a long tradition in the industry, or enjoy strong cooperation from channel members (p. 41). Finally, our analyses show that in order for the niching strategy to work, the SME does not necessarily need to process any of the two strategic advantages (low cost position, and uniqueness perceived by the customer) identified by Porter for his "Focus" strategy.

5. Discussion and conclusion

In general, SMEs lack the resources and capabilities to develop their own markets, and their small size made it difficult for them to reap the benefits arising from the economies of scale and scope, and the experience curve (Nooteboom, 1993). Thus, they are disadvantaged in terms of resources and in cost, compared to larger players such as the multi-nationals. Given these limitations, SMEs can ill-afford to embark on any ambitious market penetration and development activities that require extensive resources.

Furthermore, even if the SMEs succeed in their market entry and development efforts, they may not be able to retain the market developed in the face of entry by the larger rivals later. For example, IBM initially ignored the personal computers market. However, once the personal computers market is developed by smaller firms and a critical mass is reached, IBM muscled into the market using its vast resources, expertise, and weighty corporate image to become the industry leader (Williams, 1990). In addition, it has been reported by Hanan (1991) that Xerox has turned down several products identified by their own R&D department, because of its policy of not entering a market which has a potential of not more than US$100 million. The market for these products though small has been sufficiently lucra-

SME's STRATEGIES		INCUMBENT's BEHAVIOR	
		ACCOMODATING	AGGRESSIVE
PRODUCTS/ SERVICES OFFERED	IDENTICAL	Free-Riding Strategy	Strategic Alliance
	SUBSTITUTABLE	Niching Strategy	

Figure 3. Three generic strategies for SME.

tive for many small players who follow the niching strategy. We therefore advise against SMEs making the first move in market development, but suggest instead that SMEs exploit the market development efforts of their larger rivals by following the niching strategy of supplying substitutable products or the free-riding strategy of supplying identical products.

There are evidences that some SMEs are already following the niching and the free-riding strategies. Tan et al. (1997) provides many examples of gray marketing or parallel importing which they argue can be seen as problems of small firms free-riding on the market development efforts of the authorised distributors which are the much larger firms. We have argued that, when incumbents are faced with entry into their markets by SME entrants following the niching or free-riding strategies, the incumbents' rational response is to accommodate entry. This seems consistent with observations made by Cooper et al. (1986) and from analyses of the PIMS data. Analyses of PIMS data reveal that a new venture is more likely to be successful if it enters an industry in which the dominant incumbent has a market share of 50% or more, than if it enters an industry in which the largest incumbent has less than 25% market share (Hofer and Sandberg, 1987). Hofer and Sandberg explained that this is because, if the dominant incumbent commands more than 50% market share, then the remaining competitors must be relatively weak and are thus easy prey for the new venture. However, their argument does not explain the lack of reaction from the dominant incumbent to the new venture's entry. Our argument is that the dominant firm chooses not to react because it is in the firm's best interest to accommodate the entry of the new venture. This is because the cost of accommodation is much lower then that of aggressive counter-actions. In fact, the costs of aggressive actions to the dominant incumbent is higher the larger his market share. Hence, a dominant firm with a larger market share is less likely to react aggressively to entry into its market. This explains the results from the PIMS analysis showing that the new venture's success rate increases with the market share of the dominant incumbent.

There are evidence to show that SMEs have been forming alliances to shore up their capabilities and ward off aggressive behaviour from the bigger rivals. For example, many biotechnology firms sought out alliances with large pharmaceutical firms to commercialise their inventions (Gomes-Casseres, 1997). Gomes-Casseres also observe that semiconductor and software firms like Intel and Microsoft got their head start in the personal computer business through their early alliances with IBM while the Mips Computer Systems initiated constellation allows the company to compete against the giants in the industry like IBM and Hewlett-Packard (Comes-Casseres, 1994 and 1997).

Proofs

Proof of Lemma 1(a): $\pi_{B0} = \text{Max.}_P \Sigma_k[P_kQ_k] = \Sigma_k[P_k^0Q_k^0]$ is the monopolistic payoffs to the bigger firm before the entry of the SME. Whereas, $\pi_{B2} = \Sigma_k[P_k^*Q_k^*]$ is the duopolistic payoffs to the bigger firm after the entry of the SME. Given that the SME's product is substitutable to that of the bigger firm's, $\Sigma_k[P_k^*\Delta_{jk}(P_s^*, P_k^*)] > 0$. Hence, $\pi_{B0} = \Sigma_k[P_k^0Q_k^0] \geq \{\Sigma_k[P_k^*Q_k^*] + \Sigma_k[P_k^*\Delta_{jk}(P_s^*, P_k^*)]\} > \Sigma_k[P_k^*Q_k^*] = \pi_{B2}$. Q.E.D.

Proof of Lemma 1(b): $\pi_{B2} = (P_j^*Q_j^* + \pi_{B0}) > \pi_{B0}$. Q.E.D.

Proof of Lemma 2(a): $P_k^* = \text{ArgMax.}\ [P_kQ_k]|P_s^*$, $k = 1$ to n, and $\pi_{B2} = \Sigma_k[P_k^*Q_k^*]$, which is the maximum duopolistic payoffs to the bigger firm under Stackelberg type competition. Whereas, $P_k^{**} = \text{ArgMax.}\ \Sigma[P_kQ_k]|P_b^{**}$, where $P_s^* > P_b^{**} \in \{C, C - \varepsilon\}$ and $P_k^* > P_k^{**}$. Hence, $\pi_{B2} = \Sigma_k[P_k^*Q_k^*] > \Sigma_k[P_k^{**}Q_k^{**}]$, and $\pi_{B2} = \Sigma_k[P_k^*Q_k^*] > (\Sigma_k[P_k^{**}Q_k^{**}] + \alpha P_b^{**}Q_j^{**}) = \pi_{B1}$, if $(\Sigma_k[P_k^*Q_k^*] - \Sigma_k[P_k^{**}Q_k^{**}]) > \alpha P_b^{**}Q_j^{**}$. Q.E.D.

Proof of Lemma 2(b): $P_s^{**} = C$, thus $\pi_{S1} = \pi_{S0} < \pi_{S2}$. Q.E.D.

Proof of Proposition 1: By the perfection criteria, if the SME chooses to enter, then the bigger firm will choose to accomodate, as $\pi_{B2} > \pi_{B1}$, if $(\Sigma_k[P_k^*Q_k^*] - \Sigma_k[P_k^{**}Q_k^{**}]) > \alpha P_b^{**}Q_j^{**}$ (Lemma 2(a)). Since $\pi_{S2} > \pi_{S0}$ (Lemma 1(b)), entry is the more profitable option for the SME. Hence, {Enter, Accomodate} is the Nash equilibrium if $(\Sigma_k[P_k^*Q_k^*] - \Sigma_k[P_k^{**}Q_k^{**}]) > \alpha P_b^{**}Q_j^{**}$. Q.E.D.

Proof of Proposition 2: For a totally differentiated product, $\Sigma_k\Delta_{jk}(P_j, P_k) = 0$. {Enter, Compete Aggressively} is the Nash Equilibrium of the subgame, as $\pi_{B2} = \Sigma_k[P_k^*Q_k^*] \leq \pi_{B1} = (\Sigma_k[P_k^*Q_k^*] + \alpha P_b^{**}Q_j^{**})$, for $\alpha P_b^{**}Q_j^{**} \geq 0$. Q.E.D.

Proof of Lemma 3(a): $\pi_{B0} = (\Sigma_k[P_k^0Q_k^0] + P_b^0Q_j^0) > \pi_{B2} = (\Sigma_k[P_k^0Q_k^0]] + \alpha^0P_b^0Q_j^0)$, $j \neq k$. $\forall\ \alpha$: $0 \leq \alpha < 1$. Q.E.D.

Proof of Lemma 3(b): $\pi_{S0} < \pi_{S2} = (\pi_{S0} + (1 - \alpha^0)P_b^0Q_j^0)$, $\forall\ \alpha$: $0 \leq \alpha < 1$. Q.E.D.

Proof of Lemma 4(a): $\pi_{B2} = (\Sigma_k[P_k^0Q_k^0] + \alpha^0P_b^0Q_j^0) > \pi_{B1} = (\Sigma_k[P_k^{**}Q_k^{**}] + \alpha^{**}P_b^{**}Q_j^{**})$, $j \neq k$, if $\{(\Sigma_k[P_k^0Q_k^0] + \alpha^0P_b^0Q_j^0)$

– $(\Sigma_k[P_k^{**}Q_k^{**}] + \alpha^{**}P_b^{**}Q_j^{**})\} > 0$, which implies that $(\Sigma_k[P_k^0Q_k^0] - \Sigma_k[P_k^{**}Q_k^{**}]) > (\alpha^{**}P_b^{**}Q_j^{**} - \alpha^0P_b^0Q_j^0)$. Q.E.D.

Proof of Lemma 4(b): $\pi_{S2} = (\pi_{S0} + (1 - \alpha^0)P_b^0Q_j^0) > \pi_{S1} = \pi_{S0}$, $\forall\ \alpha$: $0 \le \alpha < 1$. Q.E.D.

Proof of Proposition 3: By the perfection criteria, if the SME chooses to enter, then the bigger firm will choose to accomodate, as $\pi_{B2} > \pi_{B1}$, if $(\Sigma_k[P_k^0Q_k^0] - \Sigma_k[P_k^{**}Q_k^{**}]) > (\alpha^{**}P_b^{**}Q_j^{**} - \alpha^0P_b^0Q_j^0)$ (Lemma 4(a)). Since $\pi_{S2} > \pi_{S0}$ (Lemma 3(b)), entry is the more profitable option for the SME. Hence, {Enter, Accomodate} is the Nash equilibrium if $(\Sigma_k[P_k^0Q_k^0] - \Sigma_k[P_k^{**}Q_k^{**}]) > (\alpha^{**}P_b^{**}Q_j^{**} - \alpha^0P_b^0Q_j^0)$. Q.E.D.

Proof of Proposition 4: $(\pi_{B2} - \pi_{B1})|(s_j \notin S) = \Sigma_k[P_k^*Q_k^*] - (\Sigma_k[P_k^{**}Q_k^{**}] + \alpha^{**}P_b^{**}Q_j^{**})$, whereas, $(\pi_{B2} - \pi_{B1})|(s_j \in S) = (\Sigma_k[P_k^0Q_k^0] + \alpha^0P_b^0Q_j^0) - (\Sigma_k[P_k^{**}Q_k^{**}] + \alpha^{**}P_b^{**}Q_j^{**})$, $j \ne k$. Hence, $\{(\pi_{B2} - \pi_{B1})|(s_j \in S) - (\pi_{B2} - \pi_{B1})|(s_j \notin S)\} = [(\Sigma_k[P_k^0Q_k^0] + \alpha^0P_b^0Q_j^0) - (\Sigma_k[P_k^{**}Q_k^{**}] + \alpha^{**}P_b^{**}Q_j^{**})] - [\Sigma_k[P_k^*Q_k^*] - (\Sigma_k[P_k^{**}Q_k^{**}] + \alpha^{**}P_b^{**}Q_j^{**})] = \Sigma_k[P_k^0Q_k^0] + \alpha^0P_b^0Q_j^0 - \Sigma_k[P_k^*Q_k^*] > 0$, since $\Sigma_k[P_k^0Q_k^0] > \Sigma_k[P_k^*Q_k^*]$. Q.E.D.

Proof of Lemma 5: Let l be the losses incurred in each time period t or T. $\pi_{Se} = -\Sigma_t lt > \pi_{S1} = -\Sigma_T lT$, $\forall\ T > t$. Q.E.D.

Proof of Proposition 5: For both cases $s_j \notin S$, and $s_j \in S$, if the SME credibly commits to stay in the market, by the perfection criteria, the bigger firm will choose to accomodate as $\pi_{B2} > \pi_{B1}$ as per Lemma 2(a) and Lemma 4(a). In addition, $\pi_{S2} > \pi_{S0}$ as per Lemma 1(b) and 3(b), implying that the SME's best response is to enter the market. Hence, {Enter, Accomodate} is the Nash equilibrium with payoffs $\{\pi_{S2}, \pi_{B2}\}$, if the SME can credibly commit to stay in the market. Q.E.D.

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