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Optimal Media Schedules in Emerging Markets

A South African perspective establishing the inherent characteristics that influence return on investment for advertising spend.

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ABSTRACT

The effect of advertising efforts on sales is of significant interest for global brands. Recent developments in emerging markets such as South Africa have brought the concept of consumer purchase behaviour in generating sales, under review. New media schedules are required to transition emerging market consumers to purchase products/services through effective marketing media platforms and through consumer brand equity whilst including price sensitivities into the media-mix. This study adds to the current literature by investigating which variables have the most significant influence in promoting and generating sales in emerging markets through the use of various advertising efforts. The primary focus was to establish an optimal marketing media schedule from which advertisers are able to choose a particular marketing media schedule to maximise their respective firms' sales.

This study investigated marketing media platforms, brand perceptions and price sensitivities. These included the influence of internet, television, radio, press and outdoor media platforms, price sensitivities and consumer brand equity in promoting sales within emerging markets.

Data to support the relevant influences was gathered through secondary data from Nielsen Holdings N.V. (an American global information and measurement company) and the South African Research Audience Foundation (SAARF). Six washing detergent brands were selected for the study, where a complete data set could be sourced.

The most influential variables in determining sales generation was consumer brand equity followed by price sensitivity. This allowed the derivation of a model extension from models identified in previous literature with the derived model including such influential variables by which brands could determine the most favourable marketing mix schedule and thereby allocate budgetary resources where necessary.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfillment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Date: 14 January 2015

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CHAPTER 1: INTRODUCTION TO THE RESEARCH PROBLEM

1.1 Background to the Problem

Luo and De Jong (2010) have confirmed that intangible assets account for over 80% of a firms' value for Fortune 500 companies. In addition, due to advertising having a direct impact on a firm's value, advertising spend through various media platforms is crucial for developing brand equity and other intangible assets within a firm. As consumers have increasingly experienced more interactive media than the passive traditional media platforms, their media consumption patterns have also altered. Internet and cellular telephone technologies, together with the convergence and amalgamation of many mass media platforms, has resulted in the advertising industry experiencing a complete paradigm shift (Rishi, 2012). As such, with these changing market circumstances, marketing managers are pressurised to optimise advertising spending and search for the most effective and affordable advertising media schedule that penetrates the firm's respective target audience.

Due to the diverse and intricate nature of media vehicles and mediums that have proven effective in both developed and developing markets (Naik & Raman, 2003; Naik, Raman & Winer, 2005), studies have examined optimal media schedules with the intention of determining the process in which to attain the highest possible return on investment for the firms' affiliated advertising spend. These studies theorised and focused on developed markets and it appears that there is a dearth of similar work that has been performed in emerging markets.

This study aimed to investigate the assumptions made in developed markets and sought to establish whether similar marketing theory and practice regarding effective media platforms are able to be transferred directly to emerging markets and produce similar success rates.

The goal of most competitive and dynamic markets is to create communication and marketing strategies that maximise sales such that firms experience substantial increases to their bottom-line (Luo & De Jong, 2010; Sheth, 2011). Marketing and communication strategies typically target advertising efforts through platforms that include media such as television, the internet, computers, smartphones, radio, press, magazines and out-of-home advertising (Blocker, 2011; Burgess & Steenkamp, 2006; Dawar & Chattopadhyay, 2002). Studies by Human, Ascott-Evans, Souter and Xabanisa (2011), as well as Rishi (2012) and Sheth (2011) found that a significant portion of emerging market consumers face constraints that limit their access to marketing media platforms that are used primarily in developed markets.

Unlike developed markets, emerging markets appear to be constrained by *relatively* under-developed media, infrastructural outlays (telecommunication infrastructure required for internet) and income gaps that affect media reach and media usage (Sheth, 2011; Rishi 2012). With the possible lack of access and affordability to the technologically advanced marketing mediums that developed market advertising typically targets (internet, smartphones), a significant portion of the emerging market population rely heavily on alternative marketing mediums to gain brand awareness and as such, companies targeting emerging market consumers are required to use these alternative mediums if they seek to promote any kind of purchase behaviour that can drive product sales (Rishi, 2012).

With the corresponding differences evidenced to exist between developed and emerging markets in terms of the variables that are deemed to promote purchase behaviour, it has been observed that most global firms that attempted to harness emerging markets have utilised similar marketing strategies, which proved successful in developed markets. By only slightly adapting their overall global marketing strategy in the execution of their product and brand positioning, pricing, promotional and distribution strategies, they have typically been unsuccessful (Dawar & Chattopadhyay, 2002). This failure rate could be attributed to the “goodness of fit” between typical

communication models and global marketing strategies to the circumstances and basic infrastructure limitations that appear to exist in emerging markets (Rishi, 2012). What developed market firms consider to be affordable, basic and accessible marketing infrastructure (internet, smartphones), is often absent in emerging markets and results in global marketing strategies and advertising efforts that are often misaligned and do not reach, much less resonate with, the predominant population of emerging market consumers.

It remains to be confirmed whether marketing theories and practice derived in developed markets (Naik & Raman, 2003), hold true within emerging markets. As such this study focused on identifying the underlying assumptions correlated with such developed marketing theories and practices and aimed to establish the applicability thereof, given the differing consumer constraints and limitations that exist in emerging markets.

1.2 Research Problem

Differences in economic and social circumstances are corresponding factors that induce the time gap between innovation creation and innovation adoption in emerging economies, with specific regard to technologically advanced marketing media platforms. This gap has implications for communication, promotion and the type of media device used to promote product sales (Rishi, 2012). Generally, media penetration varies widely among emerging markets because it is dependent on the stage of economic development, literacy rates, urbanisation, as well as on the levels of government controls (Rishi, 2012). Given these constraints, brand managers in emerging markets are confronted with budget and resource allocation decisions that differ to those experienced in developed markets and thereby face-challenging constraints that are not accounted for in developed marketing theory and practices regarding the expected maximisation of a firms' sales.

Although the measurement of return on investment for advertising spend has been established in developed markets (Naik & Raman, 2003; Naik, Raman & Winer, 2005) similar work in emerging markets appears scant. Advertisers

desire to harness the opportunities that emerging markets present and are required to implement optimal media strategies that are perceived to have the most effective and affiliated success rate. With the corresponding differences between developed and emerging markets in terms of the variables that promote and drive consumer purchase behaviour (Rishi, 2012), media planning and schedules within emerging markets have become increasingly important to brands, as the return on investment from advertising efforts forms the basis on which marketing managers are evaluated. As such, the relevance of marketing theory and practice derived in developed markets needs to be established for emerging markets so as to warrant its applicability and relevance within the emerging markets to ensure optimal schedules, theories and practice are utilised and correspondingly implemented.

1.3 Motivation for Research

With emerging markets estimated to contribute more than 65% of global economic growth up until 2020 (Euromonitor International Report, 2014) it has become apparent that the primary target audience for advertisers, and specifically for global brands that have ambitions to generate future exponential income, is to focus their advertising efforts on the emerging markets. Emerging markets must be considered as real, viable avenues within a company's strategic mission, instead of remaining peripheral to the company's core focus (Human, Ascott-Evans, Souter & Xabanisa, 2011). For global companies to successfully penetrate emerging markets in terms of future sales generation, effective marketing media platforms must be emphasised within marketing strategies in order to maximise the firms' return on advertising spend. The design of *appropriate, proven* media schedules that target alternative marketing media channels, is required to attract the mass population in emerging markets.

In as much as companies are required to establish efficient communication strategies, emerging markets are seen to constitute the major growth opportunity in the world economic order (Sheth, 2011). Currently, emerging markets present opportunities for primary goods and services. This market will

alter with globalisation of the media, as well as with increasing standards of living, rising education levels, the emergence of a larger middle class and the general inauguration of emerging markets into the global arena, resulting in a scramble for international trade liberalisation (Rishi, 2012).

With the increasing globalisation of media, platforms that are considered effective in developed markets might not necessarily be effective in emerging markets as there appears to be differing complexities involved when communicating to consumers in developed economies when compared to those in developing ones (Rishi, 2012). Studies have concluded that marketing conventions that are taken for granted in developed economies (internet, computers, smartphones) are often absent in emerging markets (Rishi, 2012; Sheth, 2011). Promoting sales generation *via* the use of various communication mediums within emerging markets might require an overhaul due to the availability of media infrastructure and affordability of both the media vehicle (television receiver) and the medium itself (magazine) (Rishi, 2012; Sheth, 2011). Similarly social and economic constraints (infrastructure, accessibility through distribution inefficiencies, education and disposable income constraints, to name but a few) that impact the communication strategies in emerging markets are delineated as crucial issues that should be considered as these have an enormous impact on who receives the communication, as well as how and when the communication is received; and, in turn these factors affect the level of purchase demands (Rishi, 2012; Sheth, 2011).

1.4 Research Objectives

The objective of this study was to investigate the underlying assumptions of a proposed return on investment marketing model (Naik & Raman, 2003) for advertising spend derived through its success within developed markets. Naik and Raman's (2003) model was utilised as the foundation from which they derived an optimal media schedule that, correspondingly proposes an optimal budgetary allocation strategy that assumes to hold true in developed markets. Whether this model remains relevant in emerging markets is yet to be

determined and as such, this study's objective is to examine the model's assumptions, applicability and relevance within an emerging market.

Further to assessing the relevancy of Naik and Raman's (2003) model within emerging markets, the research considered the variables deemed to be the most significant in their influence on the emerging markets' consumer purchase behaviour. The objective was to gain a more profound understanding of the variables that were the most influential in the promotion and generation of sales within emerging markets and to establish whether these variables were similar to those assumed inherent in developed markets, and as such being able to ascertain the relevancy and applicability of the developed market models reviewed (model 1 and 2) within the context of emerging markets.

The fundamental objectives for understanding the variables that influence, drive and promote consumer purchase behaviour in emerging markets were considered as follows:

- *Effective* marketing media platforms and their respective synergistic effects.
- The competitive landscape.
- Consumer-based brand equity.
- Price sensitivities.

This research attempted to add to the body of knowledge regarding optimal media scheduling for brands operating within emerging markets. This was executed through determining the underlying assumptions that make developed marketing theories applicable and successful within developed markets and establishing whether these assumptions accounted for the inherent marketing landscape evident in emerging markets. The study further investigated the marketing variables influence in promoting consumer purchase behaviour within emerging markets.

The findings would be of interest to the Marketing discipline as a whole as it provides insight into optimal media schedules and communication strategies that allow marketers to more effectively penetrate their respective target audience in emerging markets. Correspondingly, the analysis would also be valuable to global firms wishing to infiltrate and successfully promote their global brands by assisting them to ascertain successful and optimal marketing strategies. The findings of this research study will ensure that the proposed optimal media strategy would be representative (and reflective) of the emerging market landscape through defining characteristics that would be able to assist in yielding the highest return on investment for advertising spend (ultimately reflected by units sold) in these markets.

1.5 Emerging Market Media Landscape

With $51.4billion being spent on advertising each year (Liu & Cridland, 2013), it is imperative that marketers determine the *relevance* and *applicability* of marketing theory and practice to ultimately gain significant returns on their respective advertising investments and efforts. Marketing and communication strategies are required to ensure advertising spend is targeted through the most appropriate marketing media channels that are proved effective in penetrating their respective target audience. Proven and effective marketing media channels that penetrate the developed market consumers are not necessarily reflective of the marketing, communication and consumer behavior landscape evidenced in emerging markets (Rishi, 2012). Typically utilised marketing theories (specifically models estimating return on investment) are derived from the application of the theory's success to *developed* markets and, it remains to be proved whether the theories' effectiveness, relevance and applicability within emerging markets retains the same success rates as in developed markets.

Communication mediums in emerging markets resemble developed markets in the sense that these are both characterised by online and offline media platforms (AMPS, 2014). Despite the fact that global investments in online media have continued to increase, table 1 reveals that, regardless of

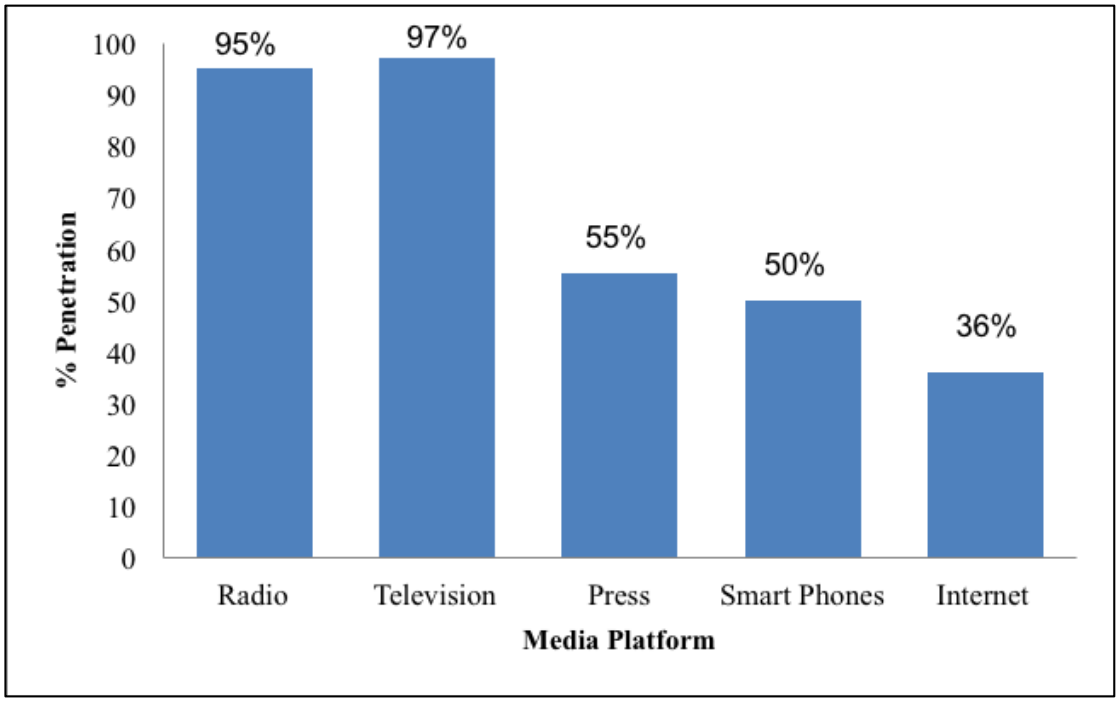
increasing online media spend, the majority share of advertising is constantly invested in offline media. Offline media investment contributes 77,9% of total advertising spend and consists of press (magazines and newspapers), radio, television and out-of-home advertising with a mere 21,5% being spent on advertising on internet.

Table 1: Share of Total Advertising Spend by Medium (%) (Zenithoptimedia, 2013)

	2010	2011	2012	2013	2014
Newspaper	21.3	20.2	18.9	17.8	16.7
Magazines	9.8	9.4	8.8	8.3	7.9
Television	39.7	40.2	40.4	40.4	40.4
Radio	7.1	7.1	7.0	6.8	6.6
Cinema	0.5	0.5	0.5	0.5	0.5
Outdoor	6.7	6.5	6.5	6.4	6.3
Internet	14.7	16.0	17.8	19.6	21.5

Among offline advertising media platforms, according to the latest All Media and Products Survey (AMPS) database (measuring audience reach according to the respective media platforms within South Africa), radio and television are by far the most popular and penetrable media platforms when consumer reach is considered, as these platforms reach more than 90% of South Africa's population (figure 1).

Figure 1: Media Penetration in South Africa (SAARF, 2014)



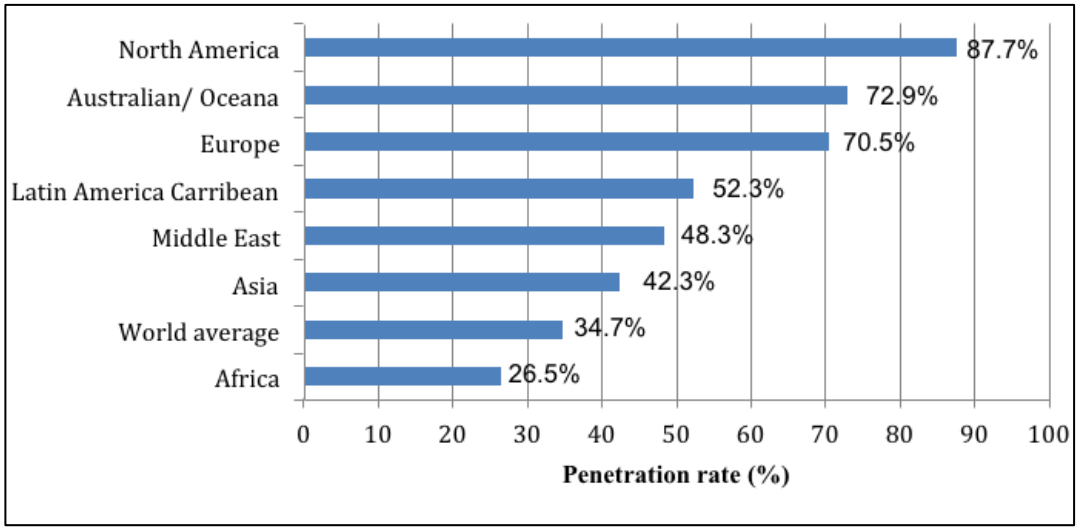
Advertisers in emerging markets consider the use of the internet, cellular technology and other advertising innovations as parts of their media mix, since internet penetration is seen to be increasing steadily within emerging markets (table 2) and reached approximately 30% of South Africa's population in 2014 (figure 1).

Table 2: World Internet Usage and Population Statistics (Internet Usage Statistics, 2014)

World Regions	Populations (2014 Est.)	Internet Users Dec. 31, 2000	Internet Users Latest Data	Penetration (% Population)	Growth 2000 - 2014	Users % of Total
Africa	1,125,721,038	4,514,400	297,885,898	26.5%	6,496.6 %	9.8 %
Asia	3,996,408,007	114,304,000	1,386,188,112	34.7%	1,1127%	45.7%
Europe	825,824,883	105,096,093	582,441,059	70.5%	454.2%	19.2%
Middle East	231,588,580	3,284,800	111,809,510	48.3%	3,303.8%	3.7 %
North America	353,860	108,096,800	310,322,562	87.7%	187.1%	10.2%
Latin America / Carribean	612,279,181	18,068,919	320,312,562	52.3%	1672,7%	10.5 %
Oceana/ Australiana	36,724,649	7,620,480	26,789.942	72.9%	251.6%	0.9%
World Total	7,128,406,505	360,945,492	3,035,749,340	42.3%	741%	100%

However, emerging markets lag substantially when the adoption of technological advancements is considered. In terms of consumer online media penetration, there is only a 30% internet penetration in South Africa, when compared to developed markets, or specifically with 87% internet penetration in North America (figure 2).

Figure 2: World Internet Penetration Rates by Geographic Regions (Internet World Statistics, 2014)



1.6 Conclusion

The disparity between developed marketing theories regarding optimal media schedules and these schedules' applicability within emerging markets, motivates the extension of current literature models (Naik & Raman, 2003; Naik, Raman & Winer, 2005) that examine optimal media schedules typically derived *via* their application to developed markets. With the prevalence of differing marketing landscapes exhibited between developed and emerging markets (Rishi, 2012; Sheth, 2011), consumer characteristics and effective marketing communication mediums and strategies need to be addressed as there appears to be huge complexities involved in promoting and generating sales by employing communication mediums in both developed and developing markets. The established complexities and affiliated market differences (Rishi, 2012) that exist between developed and emerging markets

substantiates the interrogation of whether traditional marketing strategies, theories and practices that have been derived, and proven effective in developed economies, are relevant and applicable within emerging markets. One such marketing strategy formulation derived with successful application to developed markets is that of Naik and Raman (2003), where their research has provided marketers with an optimal marketing strategy through the use of theoretical derivations that ultimately provide various models that are able to effectively calculate optimal media schedules and allocate budgetary resources appropriately, such that maximum sales are achieved.

This model derived by Naik and Raman (2003) is examined with the intention of determining the underlying assumptions that make its application successful within developed markets and to establish whether these assumptions are relevant, applicable, reflective and inclusive of the inherent marketing landscape evident in emerging markets. This interrogation ultimately requires and promotes the investigation of the variables that are deemed the most significant and influential in promoting consumer purchase behaviour in emerging markets in order to establish variable similarity to developed markets. It also examines whether Naik and Raman's (2003) model accounts for such influential and significant variables in order to determine the model's validity and applicability within emerging markets. As a discipline, Marketing will benefit enormously if it can transcend the prominent beliefs, stereotypes, and current research limitations of appropriate and relevant marketing theories and practice concerning emerging markets.

The following chapter discusses current literature concerning developed market media strategy models and their affiliated elemental assumptions. The variables that are deemed to influence consumer purchase behaviour in emerging markets are also discussed. Chapter 3 presents the research propositions that were investigated using the methodology described in chapter 4. The results of the research are presented in chapter 5 and then compared and contrasted with the literature reviewed in chapter 6. Conclusions are drawn and further research recommendations are provided in chapter 7.

CHAPTER 2: THEORY AND LITERATURE REVIEW

2.1 The Importance of Advertising on Sales

Studies across the disciplines of Marketing, Accounting and Finance have suggested that advertising spending can directly and indirectly affect firm sales and financial value. Essentially advertising may generate favourarble responses such as create market awareness, quality competiveness, customer preference and brand image (Koslow, Sasser, 2006; Tellis, 2010; Luo & Jong, 2010). These benefits induced by advertising in turn enhance future sales and profits of the firm (Osinga, Leeflang, & Wieringa, 2010; Luo & Jong, 2010). Further advertising may accelerate the velocity of consumer responses and induce faster market penetration. Srinivasan, Vanhuele & Pauwels (2009) posited that advertising helps develop instant awareness of new products that may accelerate the diffusion process, 'suggesting that firm advertising leads to more and faster cash flows'. In addition, advertising helps smooth out the variability in seasonal demands and reduces consumer risks with safer cash flows. Advertising resolves some of the uncertainty that the risk averse consumer faces and, correspondingly can create a barrier to competition, provide bargaining power *vis-a-vis* supplier and achieve greater dynamic efficiency and flexibility in adapting environmental changes than its competitors. Empirically, advertising spend is found to enhance a firm's returns and this applies to both developed and emerging markets (Joshi & Hanssens, 2009; Luo & Jong, 2010). As such, the defining characteristics of both developed and emerging markets require communication strategies that address and account for any affiliated limitations and constraints that consumers may face with specific regard to advertising efforts (Khanna & Palepu, 2010).

2.2 Developed Market Media Schedules

2.2.1 Developed Market Model 1: Synergy Effects in a Monopolistic Environment

Advertising researchers (Naik & Peters, 2009; Schultz, Block & Raman, 2009; Naik, Raman & Winer, 2005; Naik & Raman, 2003; Naik, Schultz & Srinivasan 2007; Havlena Cardarelli, and de Montigny, 2007) have recognised that when firms advertise *via* multiple-media platforms each respective platform offers differing levels of effectiveness in achieving brand awareness levels and promoting consumer purchase behaviour (Naik, Prasad & Sethi, 2009). Naik and Winer (2003) acknowledged that media effectiveness is not only limited to the main media effects individually, but that media platform interactions produce "synergies" that require even more complex models of media effects. Integrated marketing communications (IMC) emphasise the benefits of harnessing synergy across multiple media platforms to increase brand equity and, correspondingly, promote sales of products and services. Modern advertising textbooks have also adopted the IMC approach (Belch & Belch, 2014; Schultz, Patti & Kitchen, 2014; Katz, 2014; Kelley & Jugenheimer, 2010) and major universities offer IMC courses (Northwestern University; West Virginia University; Loyola University; John Hopkins University) as well as many marketers and advertising agencies have embraced the IMC concept (American Association of Advertising Agencies (AAAA)).

The American Association of Advertising Agencies (Schultz, 1993) defined IMC as "a concept of marketing communications planning that recognizes the added value of (a) comprehensive plan that evaluates the strategic roles of a variety of communication disciplines – for example, general advertising, direct response, sales promotion, and public relations – and combines these disciplines to provide clarity, consistency and maximum communications impact" (Schultz, 1993, p. 17). This definition recognised the added value aspect of IMC that is created by the joint impact of multiple activities (television, print, out-of-home, radio and internet advertising). In IMC, synergy greatly contributes to emphasising the preferred outcome, that is, total sales

(Naik & Raman, 2003). Rather than concentrating on individual media platform effects on consumers, particular interest has been placed on cross-media synergy where the collective and, combined effect of multiple activities exceeds the sum of their individual effects (Naik, Raman & Winer, 2005; Naik & Raman, 2003; Havlena, Cardarelli & de Montigny, 2007).

Naik and Raman (2003) derived a theoretical equation that estimated the impact of synergy on media budget, media mix and advertising carryover in a monopolistic market with two marketing activities. This study began with the investigation of the proposed synergy model formulated by Naik and Raman (2003) that captured advertising effort as a mix of two multimedia activities, namely, promotion and advertising, with their respective differing levels of effectiveness as well as an interaction term that captures the interaction effects of these two multimedia marketing activities on sales and, is given by:

$$S_t = \alpha + \beta_1 u_t + \beta_2 v_t + \kappa u_t v_t + \lambda S_{t-1} + \vartheta_t \quad (1)$$

Where S_t is sales at time t, β_1 and β_2 are the unequal effectiveness parameters for advertisement media U and V respectively, λ is the carryover effect, κ is the joint effect of the two media and ϑ_t is a normally distributed error term that represents the impact of other factors that are not explicitly included in the model for the sake of parsimony (Naik & Raman, 2003). Naik and Raman (2003) further illustrated that their approach substantively concluded that the synergy effects are plausible, irrespective of the carryover effect being constant or different across media (Naik, Raman, 2003. P.378). With this being said, their model presents a theoretical analysis of the effects of synergy in the IMC context, specifically in a monopolistic environment. The empirical evidence supported the existence of synergy, so the authors further went on to derive several propositions that elucidated the effects of synergy on media budgets and media mix strategies (Naik & Raman, 2003).

Naik and Raman's (2003) optimal budgetary solution is given by:

$$B = \frac{(\beta_1 + \beta_2)m}{2(1 + \rho - \lambda) - \kappa m}$$

and their optimal media mix strategy by:

$$\Lambda = \frac{2\beta_1(1 + \rho - \lambda) + m\beta_2\kappa}{2\beta_2(1 + \rho - \lambda) + m\beta_1\kappa}$$

2.2.1.1 Inherent Assumptions (Strengths and Weaknesses) of Model 1

The model was examined with the intention of understanding the underlying assumptions that make its application successful within developed markets. Model (1) comprises the following assumptions:

Strengths

- The model accounts for promotion which, according to the marketing mix of 4 P's principle, is one of the fundamental factors to consider for inclusion in a marketing media schedule as it influences consumer purchase behaviour (Keller, 2003).
- Managers can use market data to estimate and infer media effectiveness.
- Managers can use market data to estimate and infer cross-media synergy.

Weaknesses

- The model is constrained to two specific marketing activities, namely advertising and promotions.
- With the constraint of two marketing activities (advertising and promotion) media effectiveness of multiple media platforms (> 2) is assumed equal and, not considered.

- The model considers firms operating in a monopolistic environment, which is not reflective of any typical marketing environment (Naik, Raman & Winer, 2005; Naik & Peters, 2009; Winer, 2009).
- The model does not consider price sensitivities which, according to the marketing mix 4 P's principle, is one of the fundamental factors to include in a marketing schedule as it influences consumer purchase behavior (Keller, 2003).
- Correspondingly, the model does not consider product or place within the 4 P's principle of marketing, however, given the nature and intricacy of these two factors, the inclusion is not considered viable. (Keller, 2003).
- The model does not consider consumer-based brand equity. This characteristic is considered the foundation to the success of a brand as consumers' predispositions to brands' influence consumer purchase decisions and, directly effects advertising efforts (Keller, 2003, Barki & Parente, 2010).

2.2.2 Developed Market Model 2: Competition and Synergy in an Oligopolistic Environment

Although Naik and Raman (2003) established empirically the existence of synergy between multiple media platforms as well as offered theoretical insights into budgeting and allocation decisions, the limitation of this literature to a monopolistic environment, typically ignores the effect of competitors' responses to individual budgeting and allocation decisions.

Naik, Raman and Winer (2005) extended the Lanchester Model (which measures brand performance based on market share and advertising effects) as a result of other dynamic game theoretic models that ignored the role of interactions among multiple marketing activities in oligopolistic market environments. They incorporated and accounted for the interaction effects and dynamic competition that is typically present in most marketing environments, constructed a marketing-mix algorithm that yielded marketing mix plans with strategic foresight, and developed a continuous-discrete

estimation method that calibrated dynamic models of oligopoly by using market data. As such, Naik, Raman and Winer (2005) proposed the extension of optimal media schedules where they incorporated the role of competition and this is calculated by employing the following equation:

$$S_i = M(t)f_i(t) - F(t)S_i(t), \quad (2)$$

where Si(t) is the sales of brand i (i = 1,,,,,,,N); M(t) denotes category sales volume at time t; $F = \sum_{i=1}^{N} f_i$ and *fi* denotes:

$$f_i = \alpha_i u_i + \beta_i v_i + \gamma_i u_i v_i,$$

where α_i, β_1 represents the advertising and promotion effectiveness, respectively, and *yi* is the interaction effect. Advertising and promotional efforts are denoted by (*ui,vi)*, The marketing force of brand *i, i* = 1 ,,,,,,.N such that the equation proposes that the marketing force depends not only on the weight of advertising and promotion but also on their interaction; both the weights and effectiveness are brand-specific. Furthermore, each activity can amplify or diminish the effectiveness of other activities. Assuming positive effects of advertising, when brand *i* increases *ui*, it not only increases the brand sales Si (directly via Equation (2)) but also influences the effectiveness of the other activity *vi* because of the non-zero (yi) (indirectly through its *fi* function). The two activities strengthen the marketing force by creating synergy when y> 0; they weaken the marketing force when y < 0.

2.2.2.1 Inherent Assumptions (Strengths and Weaknesses) of Model 2

The model is examined with the intention of understanding the underlying assumptions that make its application successful within developed markets. Model (2) comprises the following assumptions:

Strengths

- The model accounts for promotion which, according to the marketing mix 4 P's principle, is one of the fundamental factors to include in a

marketing schedule as it influences consumer purchase behavior (Keller, 2003).

- Managers can use market data to estimate and infer media effectiveness.
- Managers can use market data to estimate and infer cross-media synergy.
- Managers can apply this model within an oligopolistic marketing environment where more than two competitors are present, which, is more reflective of typical marketing environments.

Weaknesses

- The model is constrained to two specific marketing activities, namely advertising and promotions.
- With the constraint of two marketing activities (advertising and promotion) media effectiveness of multiple media platforms (> 2) is assumed equal and, not considered.
- The model does not consider price which, according to the marketing mix 4 P's principle, is one of the fundamental factors to include in a marketing schedule as it influences consumer purchase behavior (Keller, 2003).
- Correspondingly, the model does not account for product and place within the 4 P's principle of marketing, however, given the nature and intricacy of these two factors, the inclusion is not considered viable. (Keller, 2003).
- The model does not consider consumer-based brand equity. This characteristic is considered the foundation to the success of a brand as consumer's predispositions to brands' influence consumer purchase decisions and, directly affects advertising efforts (Keller, 2003; Barki & Parente, 2010).

2.2.3 Conclusion

The developed market models presented by Naik and Raman (2003) and Naik, Raman and Winer (2005) have elemental assumptions that result in the

following factors being included/excluded for consideration within the developed market models. These factors would need to be reviewed within the context of emerging markets in order to establish whether they are reflective of the marketing landscape and, the inherent characteristics influencing or affecting advertising efforts and consumer purchase behavior within emerging markets.

- Advertising and promotions are considered.
- Media effectiveness of more than one marketing activity (namely promotions and advertising effects) are considered.
- Cross-media synergy of more than one marketing activity, namely promotions and advertising effects. These are restricted to pairwise interaction effects are considered.
- Marketing environment in which more than one brand is present and competes for market share and, correspondingly, sales (oligopolistic marketing environment) are considered.
- The model is constrained to two specific marketing activities namely, advertising and promotions.
- The model does not consider price.
- The model does not consider product or place within the 4 P's marketing mix. However, given the nature and intricacy of these two factors, the inclusion is not considered viable and will not be addressed further within this study.
- The model does not consider consumer-based brand equity.

With the prevalence of differing marketing landscapes exhibited between developed and emerging markets (Rishi, 2012; Sheth, 2011), consumer characteristics and effective marketing communication mediums need to be described and reviewed as there appear to be huge complexities involved in promoting and generating sales by employing communication mediums in developing markets (Rishi, 2012). The disparity between developed marketing theories regarding optimal media schedules and these schedules' applicability within emerging markets motivates the extension of the current literature models reviewed above. The establishment of significant and influential

characteristics (termed variables throughout the remainder of the study) in promoting consumer purchase behaviour in emerging markets is required to establish variable similarity to developed markets and, as such ascertain whether the developed market models identified and described herein account for such influential and significant variables to determine the model's validity and applicability within emerging markets.

As such, the following section discusses emerging markets by addressing its respective importance to global firms and describes the affiliated marketing landscape whilst simultaneously investigating the variables that are significant and influential in promoting consumer purchase behaviour and these variables' respective effects on a firm's advertising efforts. The literature reviewed is then focused to determine how such emerging market characteristics affect the marketing landscape and, establishes whether these characteristics are supported by the underlying assumptions inherent in the developed market models presented by Naik and Raman (2003) and Naik, Raman and Winer (2005).

Each variable identified as being influential in promoting emerging market consumer purchase behaviour in the ensuing literature is considered within the context and, with the intention of extending Naik and Raman's (2003) model. Naik and Raman's (2003) model (1) was selected to be the foundation for any further model extensions due to its relatively more '**simplistic'** approach, inherent accountability and inclusion within Naik, Raman and Winer's (2005) model (2) and, given the less demanding and detailed information Model (1) requires than that which is typically needed for the successful application of model (2).

2.3 Emerging Markets

2.3.1 The Importance of Emerging Markets

In 2013, emerging markets constituted 85% of the world's population, and 90% of those included people under the age of 30 (Euromonitor, 2013). Emerging markets' total populations are expected to grow three times faster

than developed economies between 2014 and 2020 (Euromonitor, 2013). With these statistical results, international marketers need to begin concentrating their communication efforts towards the bulk of the world's population to tap the growth markets of the future (Sheth, 2011).

Companies are required to establish efficient communication strategies, as these emerging markets constitute the major growth opportunity in the world economic order. The comparative importance of such markets is dependent on the nature of the product or service offered, which makes due diligence of the emerging markets a necessity. Currently, emerging markets present opportunities for primary goods and services. However this will alter with globalisation of the media, as well as with increasing standards of living, rising education levels, the emergence of a larger middle class and the general inauguration of emerging markets into the global arena, that will further result in a scramble for international trade liberalization (Ciochetto, 2013).

2.3.2 Emerging Markets: The Marketing Landscape

2.3.2.1 Communication Complexities Effecting the Marketing Landscape

Consumers' predispositions to established brands and increased local competition within the market place are posited to be mutually reconciling variables in promoting and driving sales within developing markets (Sheth, 2011). Many studies (Rishi, 2012; Baraki & Parente, 2010) have demonstrated that, due to social expenditures, mobility limitations and distribution inefficiencies, advertising through various media platforms is limited by the reality that a significant portion of emerging market consumers are limited by economic and educational constraints that restrict their exposure to the media platforms that typical advertising targets (Sheth, 2011, Rishi, 2012; Fletcher & Melewar, 2001).

Concepts related to successful marketing strategies that are aimed at emerging markets have been proposed. However, as with most interchangeable and volatile markets, there is no "one size fits all" strategy that advertisers can employ when engaging with, or contemplating engaging

with emerging markets (Wood, Pitta & Franzak, 2008). There are numerous challenges present when communicating with emerging markets as effective communication mediums are likely to differ substantially from those in developed markets (Rishi, 2012).

2.3.2.2 Media Platforms Affecting the Marketing Landscape

Technologically advanced marketing mediums (internet and cellular telephone technologies), together with the convergence and amalgamation of many mass media platforms (with corresponding synergistic effects) has resulted in the advertising industry in emerging markets experiencing a complete paradigm shift (Rishi, 2012). New media options have changed the media profile landscape and, stimulated major changes in communication and behaviour (Ciochetto, 2013). Media consumption patterns have altered, as emerging markets increasingly experience more interactive media than the passive traditional media of newspapers and magazines which, according to Peres, Muller & Mahajan (2010), is supported by the rising purchasing power of citizens. The concept of single mass-market accessibility has become obsolete and the new media platforms have multiplied the possibilities for advertisers (Ciochetto, 2013). It becomes evident, then, that advertisers who seek to increase 'external influences' by advertising in order to stimulate growth for specific products, need to attain the most effective marketing media platforms that are able to promote and maintain sales within this segment (Ciochetto, 2013). Advertisers need to leverage the benefits of the new mediums without compromising on the positive effects that are evident from accessing traditional effective media platforms such as press, out-of-home print, television and radio (Rishi, 2012).

The South African Media Platform Landscape

According to AMPS data, the South African market exhibits predominant marketing media platforms that are proven to have significant reach and penetration amongst the mass population (SAARF, 2014). These media platforms consist of radio, television, press, internet and out-of-home marketing activities with a 95%, 97%, 55%, and 36% (SAARF, 2014)

respective penetration within South Africa's population (figure 1). Emerging markets are also characterised by low media reach for specific media platforms (internet). Television and radio reach over 90% of the population in South Africa, while the internet penetration reaches just over 30% (SAARF, 2014). It is expected that mediums that have a wider reach may have a larger effect on sales, and it has been posited that brand managers will allocate advertisement budgets accordingly. Media reach is therefore not accounted for as a factor in the model.

With media penetration varying substantially across the South African population (figure 1), current percentage penetration reveals that not all media platforms are equally effective in their advertising efforts. Marketing conventions (such as the internet) that are taken for granted in developed countries are often absent in emerging markets (Barki and Parente, 2010; Rishi, 2012). As such, emerging markets are constrained to smaller a media repertoire's effectiveness as the penetration and reach of media platforms (figure 1) in South Africa support the notion that technologically advanced marketing media platforms (figure 1&2) would not necessarily be as effective in emerging markets (Smartphones (50% penetration and reach and, internet with 36% respectively).

2.3.2.3 Competition Affecting the Marketing Landscape

With emerging markets typically comprising oligopolistic marketing environments (Sheth, 2011), different and, several brands are seen to operate within the market. Each brand competes to ensure it exhibits high, and consistent, brand awareness levels to maintain any kind of competitive advantage (Human et al. 2011).

With the characteristics defining an oligopolistic marketing environment being that brands are not positioned uniformly in markets (Sheth, 2011) monopolistic marketing environments are not assumed to hold within emerging markets. Consumers' predispositions to established brands and increased local competition within the market place are theorised to be mutually reconciling variables in promoting and driving sales within developing

markets (Sheth, 2011). Inasmuch as emerging markets are seen to have several brands, which each brand has pre-existing brand equity that drives sales (Human et al. 2011).

2.3.2.4 Economic and Social Considerations Affecting the Marketing Landscape

The goal of most competitive and dynamic markets is to create communication and marketing strategies that maximise sales for firms to experience substantial increases to their bottom-line (Luo & De Jong, 2010; Sheth, 2011). In order to promote sales, firms rely on several communication mediums to market and advertise their products. Rishi (2012) argued that unlike developed markets, emerging markets are constrained by a *relatively* underdeveloped media infrastructural outlay (telecommunication infrastructure required for internet), as well as educational constraints, and income gaps that affect media reach and media usage (Sheth, 2011; Rishi 2012) within emerging markets.

Differences in economic and social circumstances and affiliated educational constraints are factors that induce the time gap between innovation creation and innovation adoption in emerging economies with specific regard to technologically advanced marketing media platforms (Rishi, 2012). This gap has implications for communication, promotion and the type of media device used to promote product sales (Rishi, 2012). Generally, media penetration varies widely among emerging markets because it is dependent on the stage of economic development, social landscape and affiliated literacy rates (Rishi, 2012).

Due to varying literacy levels, language barriers and established economic constraints that many typical emerging market consumers face (Rishi, 2012), certain advertising mediums (press, television, radio, out-of-home and internet) that require consumers to read, verbally comprehend a language possibly unfamiliar to themselves and, have immediate access to the firm's targeted media platform; may not necessarily attain the desired and, immediate feedback or response that the firms advertising efforts anticipate

(Henningsen, Heuke & Clement, 2011). As such, traditional targeted marketing media platforms cannot be assumed to be available, accessible or comprehensible to many consumers in emerging markets and, South Africa is not exception to this (Rishi, 2012; Dawar & Chattopadhyay, 2002).

Many marketing media platforms do not effectively communicate intended marketing messages, because emerging markets typically face language and literacy rate constraints that affect their ability to relate and/or understand many advertising efforts (Rishi, 2012). As such, these constraints are, oftentimes, seen to inhibit the ability of a significant portion of emerging market consumers to be effectively influenced by such advertising efforts and, in turn, inevitably have a negative effect on a firm's bottom line (Human et al. 2011).

National infrastructure also undoubtedly impacts the advertising efforts within emerging markets, as is the case when poor telecommunication outlays limit or impede the use of internet, which inadvertently impacts the effectiveness of this media platform (Sheth, 2011). Regardless of the communication form or medium, whether it is a letter, radio, television or out-of-home signage, certain levels of infrastructural outlays are essential to ensure that the intended recipients receive the communication (Rishi, 2012).

Correspondingly, although emerging markets and specifically low-income consumers exhibit similar characteristics to developing economies in terms of being driven by the diversity of their needs, wants and aspirations (Barki & Parente, 2010; Sheth, 2011), the most prominent characteristic that restrains their ability to relate to advertising efforts and, in turn, purchase products/services is, that they are constrained by limited resources from both a monetary and physical perspective (Sheth, 2011).

2.3.2.5 Limited Resources Affecting the Marketing Landscape

According to Barki and Parente (2010), emerging markets, specifically low-income consumers, are characterised by consistent monthly trends of immediate disposable income constraints. With just over 72% of South

Africans earning less than R5800 (Roughly $500) per month (Statistics South Africa, 2010/11), the predominant South African population consists of such low-income consumers and, it follows from Barki and Parente (2010) that the mass population within South Africa would be characterised by such disposable income constraints. Global perceptions of emerging market consumers' (specifically low income consumers) propensity to be influenced primarily by prices resultantly promotes Barki and Parente's (2010) appeal to global firms to rather target their respective advertising efforts, communication and marketing strategies to those that promise short-term benefits, as this immediate gratification and benefit will evidently drive and promote immediate sales within this consumer base (Baraki & Parente, 2010). It logically follows then, that emerging market consumers are proposed to be increasingly price sensitive (Kandachar & Halme, 2008; Simanis, Hart, DeKoszmovszky, Donohue, Duke, Enk, Gordon & Thieme, 2009), when it comes to variables that influence their purchase decisions and, correspondingly it would follow that sales and price tend to exhibit a quadratic relationship within emerging markets; the lower the price, the higher (assumed) units the brand should sell.

With the study conducted by Sheth (2011), the notion that lower income consumers in emerging markets are typically price sensitive due to their disposable income constraints supports the notion that the predominant emerging market population tend spends their little money wisely by ensuring there is no wastage (as every cent counts) and, these consumers focus more on *essentials* whereby consumers favour the lower priced items that offer acceptable quality.

2.3.2.6 Social Considerations Affecting the Marketing Landscape

Although the aforementioned section described the related price sensitivities prevalent within emerging markets and emphasised price's respective influence on typically low-income consumers' decision-making processes, recent studies (Barki & Parente, 2010; Rishi, 2012) stated that, contradictory to the notion that lower-income consumers typically purchase lower priced brands, consumers are often willing to pay more for their purchase of a specific brand. Barki and Parente (2010) and Rishi (2012) do not dispute their

aforementioned conclusions that price has an enormous role to play in the influence of consumer purchase behaviour. However, these authors emphasised the notion that brand perceptions and the brand's affiliated influence on consumer purchase behaviour is a corresponding influence that needs to be considered by marketing managers wishing to penetrate emerging markets (Barki & Parente, 2010).

Baraki and Parente (2010) and Rishi (2012) provided evidence that there are significant segments of the emerging market population who are willing to pay more for associated premium products or services from leading brands and stated that, due to the predominant lower-disposable income constraints, aspirational, status-seeking attributes and unaffordability of being able to make mistakes, consumers are seen to purchase products/services that offer and, are associated with, the highest quality, which, oftentimes comes with inadvertently higher prices. The higher priced, higher quality brand purchase decision is based on the aspiration that the brand lasts longer due its credibility and guarantee within the marketplace and/or correspondingly, that a brand will be seen to increase consumers' social status amongst their peers (Baraki & Parente, 2010; Rishi, 2012; Sheth, 2011; Pitta, Guesalaga & Marshall, 2008).

With lower income consumers willing to spend more on the purchase of a specific, higher quality, higher priced brand due to either it's associated credibility, longevity and guarantee or, that the brand is seen to bring an affiliated level of status to them socially (Baraki & Parente, 2010; Rishi, 2012; Sheth, 2011; Pitta, Guesalaga & Marshall, 2008), it logically follows that there must be inherent brand knowledge of the associated brand that enables their purchasing decision to be influenced. This action reflects the significant influence of brand perceptions in promoting purchase behaviour amongst emerging market consumers and, brings with it the notion that consumer-based brand equity is a significant variable that influences the decision-making process amongst emerging market consumers.

2.3.3 Conclusion: Marketing Landscape and Its Effect on Sales

The aforementioned literature reviewed and addressed the respective importance of emerging markets to global firms and, correspondingly, described the current emerging marketing landscape whilst emphasising specific characteristics that are significant and influential in promoting consumer purchase behaviour. The characteristics most influential in their affiliated effect on advertising efforts and purchase behaviour are listed as follows:

1. Marketing media platforms and their respective synergistic effects
2. Oligopolistic marketing environment
3. Price sensitivities
4. Consumer-based brand equity

With the above defined and concluded characteristics for consideration within the remainder of this study, the literature is now focused on determining the underlying assumptions inherent in the developed market models outlined in the beginning of the literature review (Naik & Raman, 2003; Naik, Raman & Winer, 2005) to establish whether the respective developed market models and their affiliated assumptions, account for such influential emerging market characteristics (Listed above) whilst, simultaneously proposing more inclusive extended models that are considered more reflective of the emerging market landscape and its respective influential characteristics.

2.4 Developed Market Model Implications

2.4.1 Overview

The disparity between developed marketing theories regarding optimal media schedules and these schedules' applicability within emerging markets motivates the interrogation and correspondingly, the extension of current literature models. The literature review has specifically focused on optimal media schedules derived from the application and success of the respective

models within developed markets by Naik and Raman (2003) and Naik, Raman and Winer (2005). With the prevalence of differing marketing landscapes and defining characteristics (marketing media platforms and their respective synergistic effects, oligopolistic environment, price and consumer based brand equity) identified and emphasised in the aforementioned literature review, the following sections consider each significant and influential characteristic individually in terms its accountability within Naik and Raman's (2003) model. This consideration is, due to the model relatively more 'simplistic' approach, inherent accountability and inclusion within Naik, Raman and Winer's (2005) model (2) and, given the less demanding and detailed information model (1) requires than that which is typically needed for the successful application of model (2).

2.4.2 Multiple Media Platforms

Marketing managers require an optimal media schedule that allows for the calculation of the most advantageous resource allocation amongst various marketing media platforms (Henningsen, Heuke & Clement, 2011). Most traditional media planning approaches are being challenged by the rapid expansion of media forms (print, television, websites, mobile, social networks) and the fragmentation of advertising vehicles based on a media form (programs, websites, magazines) (Winer, 2009) and, inasmuch, the budgeting and allocation of resources among various media alternatives is becoming an increasingly difficult communication task for advertisers and marketing managers.

Based on the underlying assumptions of previous models examined within this study (Naik, Raman & Winer, 2005; Naik and Raman, 2003) neither models account for the substantially differing levels of effectiveness that selected media platforms create and limited the model to two marketing activities (namely promotion and advertising). As such, media platforms that are identified as significant and influential within emerging markets (in this study, the emerging market being represented by South Africa), such as internet, press, television, radio and out-of-home media platforms are concluded to be the most significantly influential marketing mediums based on

their reach and penetration within South Africa's consumer base (See figure 1). With television and radio reaching over 90% of the population in South Africa (SAARF, 2014) and, internet penetration reaching only 30% (figure 1), it is expected that mediums that have a wider reach may have a larger effect on sales, and it is posited that brand managers will allocate advertisement budgets accordingly. Therefore media reach is not factored into the extended model.

Media penetration varies substantially across the South African population (figure 1). Current percentage penetration reveals that it is not likely that all media platforms are equally effective in their advertising efforts and, as such, unequal effectiveness of each respective media platform needs to be considered when a model attempts to estimate sales generation within emerging markets (which developed market models currently do not). With AMPS data supporting five specific media platforms that have the highest penetration and reach within South Africa's mass population, namely internet, out-of-home, radio, television and press, Naik and Raman's (2003) model (1) is extended to include five media platforms that are typically used for advertising efforts in South Africa. Due to the large number of media outlets, a different notation is used for convenience. Each j^{th} advertising medium is denoted as X_j, the spend of internet advertisement expenditure is denoted at time t as X_{1t}, Out-of-home advertisement expenditure at time t is denoted as X_{2t}, press advertisement expenditure at time t is represented as X_{3t}, radio advertisement expenditure at time t is represented as X_{4t} and television advertisement expenditure at time t is presented as X_{5t}. To account for diminishing marginal returns for each respective dollar/ZAR spend on advertising (where your first media dollar/ZAR spend has a much higher impact than spending your 1000th media dollar/ZAR), the square root X is calculated and using this notation, the equation is extended (1) to yield:

$$S_t = \alpha + \beta_1\sqrt{X_{1t}} + \beta_2\sqrt{X_{2t}} + \cdots \beta_5\sqrt{X_{5t}} + \gamma_1\sqrt{X_{1t}}\sqrt{X_{2t}} + \gamma_2\sqrt{X_{1t}}\sqrt{X_{3t}} + \cdots$$
$$\ldots + \gamma_{10}\sqrt{X_{4t}}\sqrt{X_{5t}} + \lambda S_{t-1} + \vartheta_t$$

Which, rewritten, is:

$$S_t = \alpha + \beta_1 u_{1t} + \beta_2 u_{2t} + \cdots \beta_5 u_{5t} + \gamma_1 u_{1t} u_{2t} + \gamma_2 u_{1t} u_{3t} + \cdots$$
$$\ldots + \gamma_{10} u_{4t} u_{5t} + \lambda S_{t-1} + \vartheta_t \quad (3)$$

Where:

- $\beta_1, \ldots, \beta_5$ are the unequal effectiveness parameters for each advertisement media j= 1,..,5.
- $\gamma_1, \ldots, \gamma_{10}$ are the joint effect of each two pairwise media outlets accounted for by first order interactions. No higher order interactions are included.
- $\sqrt{X} = u$

The extension of model (1) due to the questionability of its respective assumptions, is supported by the notion that marketing media platforms do not exhibit similar equal effectiveness as one another (Henningsen, Heuke & Clement, 2011) and, that media platforms that are seen to be effective in developed markets are not necessarily relevant or applicable for emerging markets (refer to figure 1 and 2). Although model (3) emphasises that managers can use market data to estimate and infer not only media effectiveness but also cross-media synergy, the model only accounts for firms operating in a monopolistic environment which, based on the aforementioned literature review by Sheth (2011) is not reflective of any typical marketing environment in the current economic climate (Naik, Raman & Winer, 2005; Naik & Peters, 2009; Winer, 2009). The defining oligopolistic marketing environment within which emerging markets operate thus require further extension of model (3), such that the inclusion of this identified characteristic is considered.

2.4.3 Emerging Markets In An Oligopolistic Environment

In dynamic oligopolistic marketing environments that exhibit more than single brand dominance, managers are required to consider the presence of multiple competitors and brands when determining their best course of action (Naik, Prasad & Sethi, 2008; Sheth, 2011; Rajagopal, 2009). Brand managers need to account not only for individual marketing activities and interactions, but also competitors' activities. With South Africa being an oligopolistic market, having different and, several brands operating within the market (Sheth, 2011) and with brands not being positioned uniformly, an inclusive model representative of this defining characteristic would be dissimilar to both model (1) derived and applicable within developed markets as well model (3), which accounts for a purely oligopolistic environment. As such, an extended model is proposed which assumes that the market has several brands and each brand has pre-existing brand equity that drives sales (Human et al. 2011). Given the interest in sales volume, each brand's unique characteristics are considered as a source of variability and allow this variation to be part of the usual white noise. Therefore each brand's sales at a given time t is modeled Sales for brand i at time t is denoted as S_{it}, it follows from model (3) that sales for brand i at time t can be modeled as:

$$S_{it} = \alpha + \beta_1 u_{1it} + \beta_2 u_{2it} + \cdots + \beta_5 u_{5it} + \gamma_1 u_{1it} u_{2it} + \gamma_2 u_{1it} u_{3it} + \cdots \\ \ldots + \gamma_{10} u_{4it} u_{5it} + \lambda S_{it-1} + \vartheta_{it} \quad (4)$$

where:

- $\beta_1, \ldots, \beta_5$ are the unequal effectiveness parameters for each advertisement media j= 1,..,5. And is constant across brands
- α_i is the brand effect or brand influence that varies across brands but is constant over time.
- $\gamma_1, \ldots, \gamma_{10}$ are the joint effects of each of the two pairwise media accounted for by first order interactions. No higher order interactions are included.
- u_{jit} is the j^{th}advertisement media expenditure for brand i at time t.

- ϑ_{it} is random noise.

Model (4)'s extension incorporates unequal effectiveness of five media platforms, synergy effects of the respective platforms and affiliated oligopolistic characteristics specifically, competition and brand presence (denoted by ϑ_{it}). Emerging markets are seen to exhibit further unique purchasing behavioural patterns (Rishi, 2012; Sheth, 2011) outlined in the aforementioned literature, namely price and consumer-based brand equity, which need to be considered.

Neither model (1) nor the extended model (4) consider the defining characteristics within emerging markets and, as such with the primary aim for marketing managers and their respective advertising efforts being that to effectively identify and meet emerging market consumer needs while respecting the related, economic and social constraints (Rishi, 2012) further inclusion of economic and social constraints evidenced in emerging markets are required within further extension of model (4).

2.4.4 Consumer-Based Brand Equity

According to the consumer-based brand equity model (Keller, 1993), brand equity is fundamentally determined by the brand knowledge created in consumers' minds by marketing programs and activities. Specifically, Keller (1993) defines consumer-based brand equity as being the differential effect that consumers have on the knowledge about a brand and their response to the marketing for that brand. The differences in perceptions of brands arise from the 'added value' endowed to a product/service as a result of past investments in the marketing for the brand (Keller, 2009). As such, marketing communication activities contribute to brand equity and drive sales in many ways (Keller 2007): by creating awareness of the brand; connecting the right associations to the brand image in consumers' memories; eliciting positive brand judgments or feelings; and/or facilitating a stronger consumer–brand connection.

While emerging market consumers are price sensitive due to lower incomes (Baraki & Parente, 2010), they are also driven by brand perception, so quality can often supersede price (Sheth, 2011; Barki & Parente, 2010). Marketers must be able to engage and utilise the increasing brand consciousness that is experienced in emerging markets, and they should utilise this opportunity to prominently develop resilient brands and increase sales amongst the emerging market consumer base by effective media platforms, while always considering the respective price sensitivities (Rishi, 2012). Inasmuch, the literature concerning consumer-based brand equity within emerging markets informed the researcher's decision to consider brand perceptions and influence as predictors. It was assumed that each brand's influence varies over time, as measured by the percentage of market share in a given period. It was expected that over time, as advertising expenditure increases, the brand influence increases and consequently sales would increase. One way to account for the individuality of each brand is to allow for variance regarding the intercept for each brand while assuming that coefficients are constant across brands and time.

Each brand's uniqueness (brand equity) drives its sales in addition to the input variables (marketing media platforms, interaction and carryover effects). The brand equity coefficient varies across brands but is constant over time, resultantly, time invariant. Ultimately, inferring that the coefficients for the input variables outlined above are going to be the same for all brands and will be the same for all time periods, the change in the following model's derivation (model 4) as a result of this assumption is the intercepts themselves, which are different for each brand. This difference is termed 'brand equity' within the context of this study (see Appendix 2 for an application of this assumption). The brand effects (brand equity) are therefore accounted for by α_i.

In order to account for brand α_i, model (4) can be written as:

$$S_{it} = \alpha_i + \beta_1 u_{1it} + \beta_2 u_{2it} + \cdots + \beta_5 u_{5it} + \gamma_1 u_{1it} u_{2it} + \gamma_2 u_{1it} u_{3it} + \cdots \quad (5)$$
$$\ldots + \gamma_{10} u_{4it} u_{5it} + \lambda S_{it-1} + \vartheta_{it} + \epsilon_i$$

where:

- $\beta_1, \ldots, \beta_5$ are the unequal effectiveness parameters for each advertisement media j= 1,..,5. And these are constant across brands.
- α_i is the brand effect or brand influence that varies across brands but is constant over time.
- $\gamma_1, \ldots, \gamma_{10}$ are the joint effects of each of the two pairwise media accounted for by first order interactions. No higher order interactions are included.
- u_{jit} is the j^{th}advertisement media expenditure for brand i at time t.
- ϑ_{it} is a normally distributed composite error term that consists of two components, (the brand specific error component σ_i^2, and the error component σ_e^2). Where $\alpha_i = \alpha_i + \epsilon_i$ and $\epsilon_i \sim N(0, \sigma_i^2)$; and $\vartheta_{it} \sim N(0, \sigma_e^2)$; and ϵ_i and ϑ_{it} are independent.

2.4.5 Price

Although emerging markets and specifically low-income consumers exhibit similar characteristics to developing economies in terms of being driven by the diversity of their needs, wants and aspirations (Barki & Parente, 2010; Sheth, 2011), the most prominent characteristic that restrains their ability to relate to advertising efforts and, in turn, purchase products/services is, that they are constrained by limited resources from both a monetary and physical perspective (Sheth, 2011). Emerging markets, specifically low-income consumers, are often characterised by immediate disposable income constraints and exhibit consistent monthly trends of limited disposable income (Barki & Parente, 2010). Inasmuch, targeted advertising efforts and marketing managers are not likely to respond to communication appeals offering long-term gain; rather reinforce advertising and marketing initiatives that promote

and respond to appeals that promise short-term benefits (Rishi, 2012), as this immediate gratification and benefit drives and promotes immediate sales within this consumer base and, must be considered within model (5)'s extension (Baraki & Parente, 2010).

The literature supports the extension of model (5) to include the role that price has within emerging markets. Model (5) can be written as:

$$S_{it} = \alpha_i + \theta * {P_{it}}^2 + \beta_1 u_{1it} + \beta_2 u_{2it} + \cdots + \beta_5 u_{5it} + \gamma_1 u_{1it} u_{2it} + \gamma_2 u_{1it} u_{3it} + \cdots + \gamma_{10} u_{4it} u_{5it} + \lambda S_{it-1} + \upsilon_{it}$$

This is denoted as:

$$S_{it} = \alpha_i + \theta * {P_{it}}^2 + \sum_{k=1}^{5} \beta_k u_k + \sum_{\substack{k,j=1 \\ k<j}}^{5} \kappa_{kj} u_k u_j + \lambda_i S_{i,t-1} + \upsilon_{it} \quad (6)$$

where:

- S_{it} is sales at time t,.
- α_i is the brand effect or brand influence that varies across brands but is constant over time.
- θ is the effect of brand i's price.
- P_{it} is the price of the brand i at time t where P^2 represents the relationship between price and sales being curved in nature (quadratic relation).
- $\beta_1, \ldots, \beta_5$ are the unequal effectiveness parameters for each advertisement media k= 1,..,5, and these are constant across brands.
- α_i is the brand effect or brand influence that varies across brands but is constant over time.
- $S_{i,t-1}$ is the sales in the previous time period for brand i.
- λ_i is carryover effect for each brand (that is, how influential past sales have been to current sales).
- ϑ_{it} is a normally distributed composite error term that consists of two components (the brand specific error component σ_i^2, and the

error component σ_e^2). Where $\alpha_i = \alpha_i + \epsilon_i$ and $\epsilon_i \sim N(0, \sigma_i^2)$; and $\vartheta_{it} \sim N(0, \sigma_e^2)$; and ϵ_i and ϑ_{it} are independent.

2.4.6 The Implications of Model 6

2.4.6.1 Inherent Assumptions

As informed by Naik and Raman's (2003) research, the following assumptions are made regarding model (6) before any empirical analysis commences.

- It is assumed that exogenous factors (expenditure on media) are independent of the previous period's sales.
- It is assumed that only first order interactions are considered. It is recognised that synergy of more than two media may exist but higher order interactions are excluded and this is recommended as an area of future research.
- It is assumed that the current expenditure on media contains all the information about today where previous period expenditure does not influence today's sales. It is recognised that there may be some lagged expenditure effects, but Naik and Raman's (2003) thought processes are adopted while the lagging is excluded among predictors.
- It is assumed that expenditure and sales are measured at the same time.
- It is assumed that a quadratic trend in the sales and price series exists, where the nature of the relationship between sales and price is assumed to be curved (the lower the price, the more units purchased). Thus price is denoted as $\theta {P_{it}}^2$ where; θ is the effect of brand i's price and P_{it} is price of the brand i at time t where P^2 represents the relationship between price and sales, which is curved in nature (quadratic).
- It is assumed that diminishing marginal returns on advertising expenditure on media platforms across all brands are accounted for by denoting $\sqrt{X} = u$.
- It is assumed that a linear trend exists in the sales series.

- It is assumed that unequal effectiveness parameters for each media platform exist and that this is constant across brands.
- It is assumed that the brand equity effect α_i is a random variable with a mean α_i and variance σ_i^2.
- It is assumed that the errors ϑ_{it} are normally distributed with mean 0 and variance σ^2. Variance is allowed to be either homoscedastic or heteroscedastic, pending empirical tests.

2.4.6.2 Concluding Remarks

The body of knowledge that exists concerning optimal media schedules and corresponding communication strategies based on established econometric models is extensive (Naik & Raman, 2003; Prasad, Raman & Winer, 2005; Rishi, 2012; Blocker, 2011; Burgess and Steenkamp, 2006; Khanna and Palepu, 2005; Dawar & Chattopadhyay, 2002). The literature reviewed supports the conclusion that established media schedules and communication strategies applicable within developed markets are not necessarily reflective of the emerging market landscape in terms of the significant characteristics (variables) being influential in driving and promoting consumer purchase behaviour as a result of advertising efforts.

The existing research literature suggests that significant differences exist between emerging and developed markets (Sheth, 2011; Rishi, 2012) and, as such marketing schedules' models cannot be transferred directly into emerging markets. With numerous challenges being identified with communicating and marketing strategies in emerging markets (Rishi, 2012), the proposed model (6) merely accounts for the identified and reviewed challenges and characteristics (namely marketing media platforms and their respective synergistic effects, oligopolistic marketing environment, price and consumer based brand equity) identified in the aforementioned literature review within the context of South Africa as an emerging market. This results in model 6 being adopted for the empirical analysis as the defining

characteristics influencing advertising efforts on sales within emerging markets are addressed and accounted for within such model.

2.5 Conclusion

The literature provided an overview of:

- Existing models that have been derived in developed markets as well as their respective underlying assumptions.
- The importance of emerging markets for global brands.
- The current marketing landscape within emerging markets specifically, South Africa.
- The significant variables influencing the marketing landscape and consumer purchase behavior affecting advertising efforts in emerging markets namely:
  - Communication complexities affecting the marketing landscape
  - Media platforms affecting the marketing landscape
  - Competition affecting the marketing landscape
  - Economic and social considerations affecting the marketing landscape namely, price and consumer-based brand equity)
- The extension of model (1) derived by Naik & Raman (2003) to include significant variables that are posited to influence sales in emerging markets and, are represented by model (6).
- The variables considered within the extended model (6), are as follows:
  - Five significant multiple media platforms namely, internet, television, Radio, Press and Out-of-home advertising each exhibiting unequal effectiveness parameters for each respective advertisement media platform.
  - The joint effect of the identified five media platforms whereby each two pairwise media platforms are considered by the first order interactions.
  - The media expenditure for each brand *i* at a respective point in time *t*.

- The impact of several brands operating in an oligopolistic environment, which considers each brand's unique nature.
- Price sensitivities.
- Consumer-based brand equity at a respective point in time *t*.

Like most markets, there is no "one size fits all" plan for companies engaging or contemplating engaging with emerging markets. However, given the limited research on effective media schedule models within emerging markets, firms will gain from the establishment of the proposed, more inclusive and relevant model (6) as it accounts for defining characteristics that are influential in promoting consumer purchase behavior. This results in model 6 being adopted for the empirical analysis where the model's validity and applicability within emerging markets will be established. Through the validation of model (6), optimal marketing strategies will be derived that will propose theoretical insights as to how firms should effectively allocate their resources to respective marketing media platforms that will yield the highest return on their investment for advertising spend (Represented by units sold).

CHAPTER 3: RESEARCH OBJECTIVES

The previous chapter discussed four variables (Marketing Media Platforms, Competing Brands, Consumer Based Brand Equity and Price) that are considered influential in driving and promoting the optimum level of sales for a brand operating in an emerging market. Many studies have been completed where specific variables have been investigated regarding their influence in determining sales in developed markets. However, the intention of this research is to explore the defining characteristics (out of the four variables identified in chapter 2) that are the most significant in influencing sales in emerging markets.

3.1 Aims and Objectives

This research study aimed to accomplish the following:

1. To bridge the gap of establishing which marketing media platforms (including and allowing for each respective media platform's synergy, carryover and lagged sales effects) are effective in promoting and generating sales for firms within emerging markets.

2. Testing the extended and proposed model (6) validity in terms of being able to more accurately estimate the levels of sales that are generated and attributable to effective emerging market media platforms and, to understand and justify the role that price sensitivities and consumer-based brand equity play when promoting/hindering sales within emerging markets.

3. To derive an optimal IMC strategy that will effectively inform marketers of the best methods they can employ to allocate budgetary resources when finalising media plans and schedules whilst attempting to attain the highest return on investment (in terms of sale generation) for their advertising efforts.

The research study sought to provide a firm with an extended model (6) that is appropriate and optimal in terms of sales creation within emerging markets. The model development has been established by considering the effective marketing media platforms in South Africa (including each respective media platform; synergy, carryover and lagged sales effects) as well as considering the price sensitivities and brand preferences (consumer-based brand equity) that emerging markets typically exhibit.

The model (6) has incorporated these variables by extending one effective marketing mix strategy developed by Naik and Raman (2003). The model was specifically selected to form the foundation of the established research model due to its established and, relatively, accurate origin of optimal marketing mix strategies that yield the highest returns. The accuracy is due to the inclusion of multiple media platforms, synergy, carryover and lagged sales effects on advertising efforts through various media platforms.

3.2 Research Propositions and Questions

The above information emphasised the requirement for the following research propositions to be investigated for selected brands in the South African market.

1. **Research Proposition 1:** The five respective media platforms (internet, television, radio, press and out-of-home advertising) are imbalanced in their level of effectiveness and significant in influencing sales within emerging markets.
2. **Research Proposition 2:** Consumer brand equity is a significant influence in promoting and determining sales within emerging markets.
3. **Research Proposition 3:** Price is a significant influence in promoting and determining sales within emerging markets.
4. **Research Proposition 4**: Models attempting to optimise sales derived in emerging markets differ from developed market models.

CHAPTER 4: RESEARCH METHODOLOGY

The following section describes the research design that was followed to achieve the research objectives. It further discusses the unit of analysis, sampling method and sample size as well as elements relating to the collected data. Limitations of the research are identified at the end of the chapter.

4.1 Introduction

The objective of this research study was to validate the extended model's (6) effectiveness in terms of estimating the level of sales generation through multiple marketing media platforms, affiliated price sensitivities and brand preferences in emerging markets. This research study ensured that only consumers in emerging markets and the advertising (stimuli) that they are exposed to were considered. Specific marketing media platforms like internet, radio, television, printed press (magazines and newspapers), and out-of-home advertising, as well as price and consumer brand equity were assessed as being captured formally by an emerging market.

4.2 Research Design

Based on current literature reviewed, focus on this study and the related research required the establishment and measurement of sales generation with consumer markets in South Africa.

According to Cooper and Schindler (2014), quantitative research attempts "precise measurement of something" (Cooper & Schindler, 2014) and is able to measure consumer behaviour, knowledge, opinions or attitudes. Saunders, Lewis and Thornhill (2009) further defined quantitative research as a technique that utilises a variety of statistical analysis techniques that range from providing a simple description of the variables involved, to establishing

statistical relationships among variables through complex statistical modeling (Saunders, Lewis & Thornhill, 2009). With these aptly identified definitions, the quantitative data analysis attempted to validate the extended model (6) by establishing significant relationships inherent in the secondary data that promotes consumer purchase behaviour (sales) as well as the development of an extended statistical model that gives rise to an optimal media schedule.

The study consisted of a quantitative data analysis of secondary data provided by Nielsen Holdings N.V. (an American global information and measurement company) for the washing detergent category that was captured weekly over a two-year period (from 2012 to 2014). Nielsen provided data for weekly advertising spend for each media type for every brand; as well as for the weekly prices per unit per brand and weekly units sold for each respective brand. The All Media and Products Survey (AMPS) secondary data from Living Standards Measure (LSM) 1 to 10 was used to analyse South African consumer disposable income levels to establish income constraint trends that were attributable to each brand's respective targeted consumer base through the use of each respective marketing media platform.

Quantitative data is best used for descriptive or explanatory studies whereby the sample is sufficiently large from which to draw conclusions (Creswell, 2003). This initial sample frame consisted of 735 cases. Saunders and Lewis (2012) cautioned that the method of sampling, the level of bias as well as the sample size needs to be carefully considered when attempting to make conclusions regarding the total population. This was a risk due to the data availability limitations that only secondary was utilised (where further brand specific data was required from firm's internal research) and the respective time frame constraints that the data included (two years). The research study was also limited to one category (washing detergent) sample set consisting of seven brands over a two year weekly period.

The aim of this research was to examine whether the extended model (6) is supported by the most statistically 'influential' variables and relationships found within the secondary data that should, ultimately be considered when advertising within South Africa with the goal of ascertaining increased sales.

Secondly, the research served to derive an optimal media schedule, based on the model's extension, that allows advertisers to optimally allocate their resources amongst various media platforms to gain the highest level of return on investment from such advertising effort (spend). The process of deduction was used to formulate the final model. Saunders and Lewis (2012) defined a deductive research approach as the testing of a theoretical proposition by using a research strategy specifically designed for the purpose. This approach builds a theory from the literature and then tests that theory. The relevant and possible variables were identified in the literature.

This research stage was quantitative in nature as it analysed secondary data in order to corroborate an extended model (or develop and derive a more accurate model) as well as derive an optimal media schedule and pricing strategy that promotes the highest levels of sales.

4.3 Unit of Analysis

The research study focused on various brands advertising spend through multiple marketing media platforms, as well as on brand price and brand equity of each of the respective brands within the consumer market place in South Africa. The unit of analysis was therefore the brands responsible for deciding on and deploying advertising strategies that focused efforts on marketing media platforms, prices and their respective brand equity within the market place.

In many cases brand spend on respective marketing media platforms were zero.

4.4 Universe

Saunders and Lewis (2012) define the population as the complete set of group members that meet the requirements of the study. The requirements of the study included brands within the washing detergent category (Nielsen) and disposable income for LSM1-10 (AMPS). The time frame was restricted

to the years between 2012 and 2014.

Scan Track Data and Advertising Spend

Nielsen provided data from 15 national retailers operating within South Africa, which covered 7 washing detergent brands. Due to one brands inconclusive results being riddled with null values throughout, it was initially reviewed and then excluded from the remaining analysis. Correspondingly, due to another brands late entry to the market over the reviewed period, the brand was considered initially and then excluded from the remaining analysis. The data provided was based on the entire South African population consuming washing detergent and each respective brands advertising spend through a variety of media platforms. As such the complete population size of consumers for the washing detergent category is unknown.

Disposable Income of Consumers In South Africa

SAARF is renowned for conducting many major media and product/brand surveys, one of which is the AMPS database. AMPS includes extensive information on media as well as products, services, brands, attitudes, interests and activities and is South Africa's only free source of data that includes nearly 120 product categories and more than 1 500 brands. The requirements of the study included consumers based in South Africa who were categorised according to LSM 1 to10 of the LSM group rating from the SAARF AMPS 2012–2014 database. The population comprised of adults who were aged 15 years or older and were residents in private households, or hostels, residential hotels and similar accommodation in the Republic of South Africa. Excluded from the universe were residents of such institutions as prisons or hospitals as well as excluding military personnel on active service. From 2013, no minority sub-populations have been excluded from the universe.

4.5 Sampling method and size

Scan Track Data and Advertising Spend

Nielsen provided scantrack and advertising spend data for the washing detergent category, which was received from 15 national retailers and 7 brands operating within the washing detergent category in South Africa. The data provided sales (promo versus non-promo, baseline versus incremental), price (promo versus non-promo) and distribution of promotion covering all in-store tracked data provided by each retailer as well as each respective brands advertising spend through a variety of media platforms. The data provided was based on the entire South African population consuming washing detergents.

Disposable Income of Consumers In South Africa

The sample for this study originated from the AMPS database which, given the study limitations of LSM 1 to 10, constituted a total sample size of 25 510 adults who were aged 15 years and older spanning across seven differing brands within the South African washing detergent category. With AMPS providing data usage of 120 product categories and 1500 brands, distribution channels and marketing media platforms were identified for a variety of products. For the purposes of this study, the marketing media platforms included the internet, radio, television, press and out-of-home advertising.

4.6 Data Gathering

Scan Track Data and Advertising Spend

The data source for this study was archival data from 2012-2014 provided by Nielsen. This data was able to provide information pertinent to the weekly advertising spend per media type per brand, weekly prices per unit per brand and weekly units sold for each respective brand. The data provided was for seven different washing detergent brands. Nielsen receives weekly scanning (point of sale) data from retailers; processes the data via their global platform (Consumer Information Platform) and, then aligns the data with global

methodology to remove cross-market variance.

Disposable Income of Consumers In South Africa

The data source for the South African consumer disposable income levels was archival data from the AMPS 2012-2014 LSM 1-10 sampling wave.

4.6.1 Data Description

Scan Track Data and Advertising Spend

The detergent industry data obtained from Nielsen was used. The data consisted of seven detergent brands collected weekly for a period of two years from September 2012 to September 2014. For any given week, the data on each sale volume (measured by units sold), media advertising expenditure and prices for all brands was made available. The data consisted of sales volume (units sold), internet expenditure, out-of-home expenditure, press/print media expenditure, radio expenditure and television expenditure in South African Rands (ZAR). The data also consisted of the price for each unit. The indicators available for analysis comprised of:

- Units sold per brand.
- Price of units sold per brand.
- Marketing media spend per media type per brand.

The level of sales was established as a dependent variable for statistical test purposes and, with the exclusion of two of the seven brands from the statistical analysis, the following independent variables were also established and included:

- The square roots of advertising spend per brand on five marketing media platforms (internet, radio, out-of-home, television and press).
- The square of price for each brand per week (to account for a quadratic trend in the sales and price where the nature of the relationship between is assumed to be curved – the lower the price, the more units sold).
- Brand effects for *five* washing detergent brands in total (Maq, Omo, Skip, Sunlight and Surf).

When fitting model (6), the sales volume (measured by units sold) denoted for brand *i* as $\boldsymbol{S_{it}}$ for time *t* = 1,2,….,24. Each j^{th} advertising medium was defined as X_j. The spend of internet advertisement expenditure at time t was represented as X_{1t}, out-of-home advertisement expenditure at time t was quantified as X_{2t}, press advertisement expenditure at time t was denoted as X_{3t}, radio advertisement expenditure at time t was defined as X_{4t} and television advertisement expenditure at time t was represented as X_{5t}. However, as outlined in the literature reviewed in chapter 2, in order to account for diminishing marginal returns for each respective Rand spent on advertising (where the first media Rand spent has a much higher impact than spending the 1000th media Rand), the media advertising expenditure (*X)* for brand *i* at time *t* on internet advertising was defined as $\boldsymbol{u_{1it}}$, out-of-home (OOH) advertising was denoted as $\boldsymbol{u_{2it}}$, press/print media advertising was represented as $\boldsymbol{u_{3it}}$, radio advertising was classified as $\boldsymbol{u_{4it}}$ and television advertising was calculated as $\boldsymbol{u_{5it}}$., where $\sqrt{X} = u$ accounts for diminishing marginal returns on advertising spend.

Disposable Income of Consumers In South Africa

The average household and personal income for LSM1-10 was received through the AMPS database obtained from SAARF. The data consisted of average household and personal income for the respective LSM population groups over an annual two year time period from July 2012-Jun 2013 and, July 2013-June 2014. For any given year, the data for each income value was measured in South African Rands (ZAR).

4.6.2 Data Confidentiality

The secondary data is made publicly available and, as such was not deemed confidential by Nielsen or SAARF. The brand names are thus published in the study and, are conveyed in the below table:

Table 3: Washing Detergent Brand Codes

Brand Code	Brand Name
Brand 1	Maq
Brand 2	Ariel
Brand 3	Bio Classic
Brand 4	Omo
Brand 5	Skip
Brand 6	Sunlight
Brand 7	Surf

4.6.3 Data Cleaning

A total of 735 cases were reported initially, however, as stated in the universe section, due to one brand's (Bio Classic) inconclusive results being riddled with null values throughout, it was initially reviewed within the descriptive statistical analysis and then excluded from the remainder of the analysis. Correspondingly, due to another brand's (Ariel) later entry into the market over the reviewed period, Ariel was considered in the descriptive statistics and then excluded from the remainder of the analysis.

As such, 525 cases (weekly data for a two year period for five brands) were recorded. Weekly data was used to describe the data in the descriptive analysis section thereafter, using the date, the data was grouped by summing units sold and media expenditure by month to generate desired monthly data. The average price was used as the monthly price data.

4.6.4 Data Analysis

Computer-aided quantitative data analysis software, SPSS and SAS were utilised throughout this study and mathematical software, Wolframalpha was

used to calculate optimal media strategy solutions. Data from both Nielsen and SAARF were combined and assessed to determine whether there were any issues and/or inconsistencies surrounding the interpretation and levels of complexity of the items as well as any misunderstood technical terms. The data was described, the model was fitted, the model diagnostics were analysed and significant variables were tested. Thereafter, the model was refitted, model selection was performed and diagnostics were analysed and the formulation of the advertiser's budgeting and allocation were completed and derived from the optimal IMC strategy that was conducted.

4.7 Validity and Reliability

Validity considers whether the findings are really about what they appear to be. It refers to the extent to which data collection methods accurately measure what they intended to and that the research findings are really about what they profess to be (Saunders & Lewis, 2012). Validity is therefore important in the design and execution of research. Walonick (2011) indicated that validity is generally determined by the judgment of the researcher and is therefore difficult to determine. The secondary data used in this study and research was based on data generated from two credible and reputable sources within the South African marketplace. Nielsen obtained its scantrack and advertising spend data directly from retailers within South Africa, which results in the validity of the data as the collection methods accurately measure what they intended to and are about what they profess to be. Correspondingly, AMPS data included extensive information on media as well as products, services, brands, attitudes, interests and activities where the sample base constituted of LSM1-10. The SAARF LSM is a distinctive method for segmenting the South African market as it divides people without considering race and does not rely on other outmoded techniques of categorising people (SAARF, 2014). The SAARF LSM has become the most widely used marketing research tool in Southern Africa and, as such reaffirmed the validity of the data in this study.

Essentially, reliability refers to the ability to repeat the measurement to produce consistent findings over time (Walonick, 2011). It is the degree to

which measures used will produce the same results on different occasions or when used by other researchers. The secondary data can be obtained and used to repeat the study on different occasions. The results may be influenced by increased/decreased advertising spend and by the category in question thereby influencing the solution (Saunders & Lewis, 2012). Due to the credibility of the secondary data the risk (outlined in the aforementioned validity review) in this study was minimal. Using credible reported company datasets (Nielsen and SAARF), which were observed public data, reliability of the dataset was ensured. This research used data collected from Nielsen and SAARF, both of which offer publicly available datasets that are updated periodically and widely used. The nature and reliability of the data set ensured that future researchers can repeat the analysis and arrive at the similar results at different times. For the purpose of this research, only one category namely, the washing detergent category, was utilised by a given research house that provided weekly scan track data to ensure its consistency and reliability.

4.8 Research Limitations and Assumptions

4.9 Limitations

The nature of this research study had potential research limitations. These included the following:

- This study was constrained geographically as it was limited to the South African market and hence according to Saunders and Lewis (2012), the use of non-probability sampling used in this study probably resulted in the sample (South African LSM1-10 according to AMPS) not being fully representational of emerging market populations in general. These limitations introduced the potential for sampling error.
- While there were seven brands in the data collected from Nielson, most of the media expenditure data was equivalent to zero, which influenced the significance of marketing media platforms significantly.

    - Television expenditure was the only variable with somewhat complete data.
    - Bio Classic had more than 80% of spend data that was equivalent to zero.
    - Surf had internet and press expenditures all equivalent to zero.
- One of the brands (Ariel) entered the market later than the other brands so it had less time periods.

CHAPTER 5: RESULTS

The following chapter presents the most prominent results from the secondary data analysis. As described in chapter 4, data was gathered from two independent sources, Nielsen and SAARF. Nielsen data was used as the main source for the analysis whilst AMPS data was used to analyse disposable income constraints amongst targeted consumer groups for each respective brand for each media type that was utilised for advertising. Descriptive statistics for the sample are provided first, the model (6) is fitted to the data, and the results are related to the actual significant variables influencing sales. A proposed model was concluded that determines optimal sales in emerging markets and finally, the application of the IMC strategy is presented. The most significant variables from the secondary data are provided in support of the final proposed model. The presentation of data follows in the same order as outlined by the research questions in chapter 3.

5.1 Descriptive Statistics

A total of 525 cases were recorded within the dataset provided by Nielsen for the five washing detergent brands over the weekly periods from 2012 to 2014. A total of 120 cases were included in the analysis when testing significant variables that influenced sales and fitted the model. As stated in the data cleaning section, due to Bio Classic's data consisting of considerable null values throughout, and Ariel entering the market at a late stage, both these brands were initially reviewed and were then excluded for the remaining descriptive statistics and analysis.

Given that most media expenditure data was equivalent to zero (table 4), the researcher was confronted with the below data limitations, which needs to be considered throughout the analysis as the zero inflated data would impinge heavily on whether any of the media platform variables would influence the dependent variable (units sold).

Table 4: Percent of Media Spend that is Zero

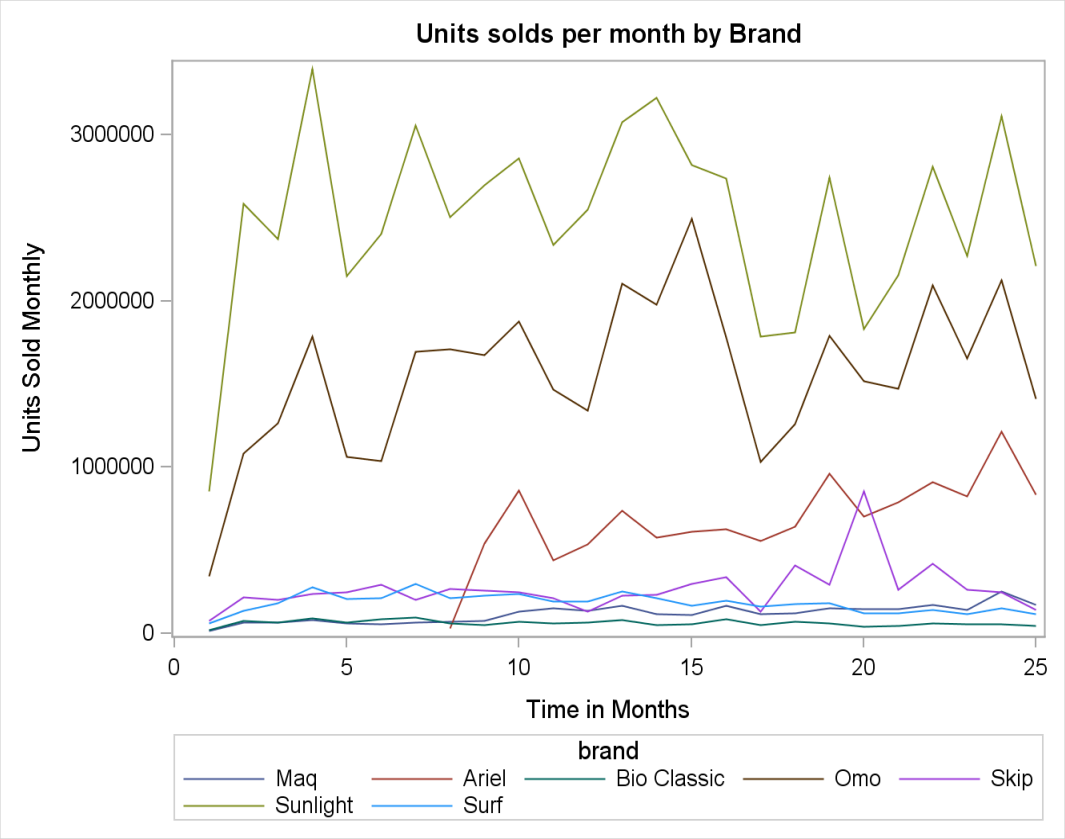
Brand	Internet Spend	OOH Spend	Press Spend	Radio Spend	Television Spend
Ariel	83%	17%	67%	94%	0%
Bio Classic	100%	100%	96%	100%	88%
Maq	96%	44%	76%	56%	44%
Omo	88%	32%	52%	8%	4%
Skip	84%	100%	80%	100%	16%
Sunlight	100%	20%	96%	76%	8%
Surf	100%	24%	100%	80%	20%

Table 5: Selected Brands and their Corresponding Media Spend Categories

Brand	Internet Spend	OOH Spend	Press Spend	Radio Spend	Television Spend
Ariel	-	✓	-	-	✓
Bio Classic	-	-	-	-	-
Maq	-	-	-	-	-
Omo	-	✓	-	✓	✓
Skip	-	-	-	-	-
Sunlight	-	✓	-	-	✓
Surf	-	✓	-	-	✓

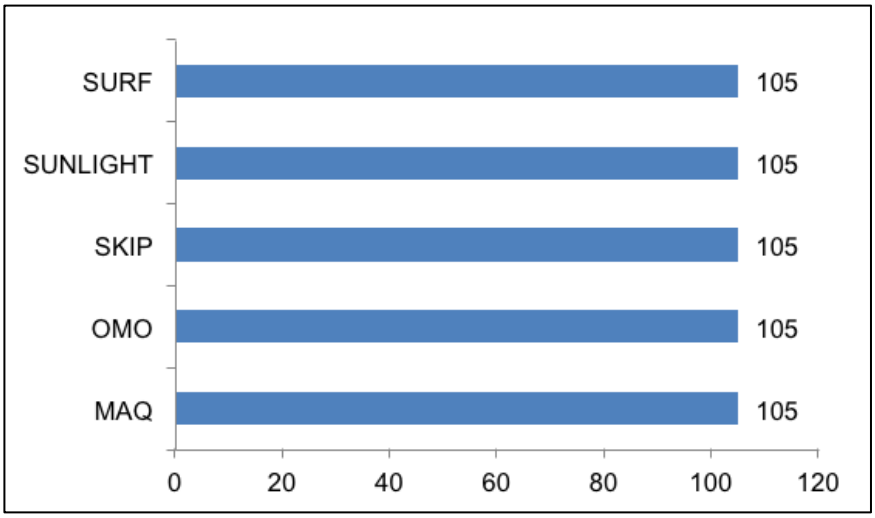
Based on table 5, only four brands had usable data. Figure 3 demonstrates the monthly sales unit series for each brand over a two-year period from 2012 to 2014. Ariel joined the market later (at time=9), which explains the break in the series.

Figure 3: Units Sold Per Month by Brand



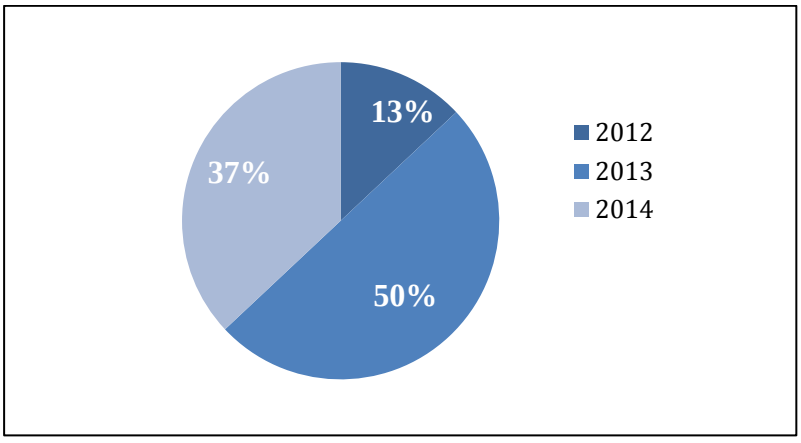
The series depicts that Sunlight was a leading player, while surf trailed with relatively flat sales volume (measured by units sold), which is an indication that the difference in consumer-based brand equity impacts sales. The series does not depict any apparent seasonal effects; seasonal effects are not considered. However, given the small number of data points, the data may be too small to reveal those effects and it is recommended that the analysis is performed using more data points (over a longer time period). Future researchers are cautioned to check these seasonality effects and account for them as dummy variables, should effects be exhibited. Omo and Sunlight demonstrated some sharp swings revealing a similar trend among all brands except Surf (figure 3). Overall, apart from the ramp at the beginning, the series appears stationary. The distribution between the five brands across the weekly, three-year period in review was perfectly balanced with 105 cases registered for each brand.

Figure 4: Frequency by Brand (Number of cases using weekly data)



With regard to weekly observation points, the points were spread across three years, starting from 2012 and concluding in 2014 with the majority of the cases being collected in 2013 (260) and the lowest number of cases in 2012 (70). The differences appeared due to the incomplete 2012 and 2014 with distinct starting months and ending months. Even though the distribution for each year was unbalanced, the collection of data was performed using an uninterrupted sequence of weeks over a 24-month period.

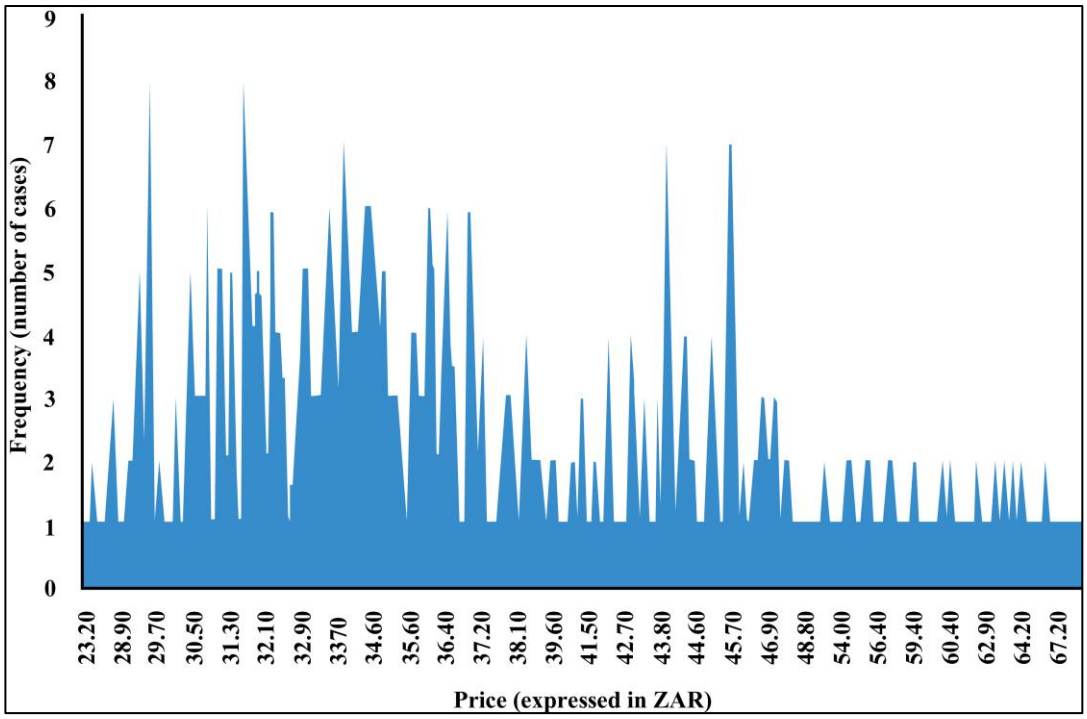
Figure 5*:* Frequency by Years (%) (Weekly data)



The price variable changed from a minimum value of ZAR23.2 to a maximum value of ZAR69.9. The mean value for the price dataset was calculated at ZAR39.86 with a median value of ZAR36.2. In terms of units sold, the weekly

mean was equivalent to 220,329 units, while the median of the indicator was found at 57,160 units.

Figure 6: Frequency by Price (Weekly data)



The advertising spend per marketing channels, as evidenced in table 4, demonstrated that the investments were sporadic with numerous weeks defined by zero investments. The television-marketing channel was the most populated platform, with only around 28% of the values that were equivalent to zero. Conversely, out-of-home marketing, press and internet received lower emphasis with sporadic investments and inconclusive data. The television segment also generated the highest weekly mean investments, calculated by using the square roots of the variable, followed by the out-of-home, radio, internet and press categories.

Table 6: Advertising Spend Category Distribution

Spend Category	Non-Null Values	Coverage %	Mean of Sq Root (ZAR)
Television	378	72.0 %	962
Radio	169	32.2 %	455
Outdoor	82	15.6 %	715
Press	36	6.9 %	253
Internet	10	1.9 %	315

5.2 Empirical Analysis

Standardisation transformation was performed on the data so that the units of the regression coefficients were the same. This was done so that all parameters had the same scale for a fair comparison. Only the responses were standardised for this analysis.

5.2.1 Residual Plots of Full Model (6)

The Dickey Fuller test (suggested by Naik & Raman, 2003) was employed on the series and resultantly observed a p-value that was equivalent to 0.391 at lag 1, which indicated that the series was stationary. It was realised that serial correlation tests apply to data with long time series, but serial correlation was tested nonetheless. A large p-value was observed (p-value was equivalent to 0.3358), which indicated no serial correlation. Pairwise bivariate correlation tests revealed collinearity among all media vehicles except television, which could be attributed to the zero inflation among most of the variables. The researcher selected to keep all the variables in the analysis. Residual diagnostics indicated kurtoses of 0.16 and kurtoses of 0.98 (table 7) respectively, indicating a symmetric distribution. The QQ plots also aligned well with the diagonal line that indicated a symmetric normal distribution (figure 7,8 and 9). Numeric tests (*Shapiro-Wilk and Kolmogorov-Smirnov)* confirmed that the residuals are normal. The residual plot (figure 7,9 and 9) indicated homoscedastic errors**.** The model diagnostics were generated and

the assumptions were cross-examined, resulting in the remainder of the analysis to proceed.

Table 7: Full Model Residual Results

Moments			
N	125	**Sum Weights**	125
Mean	-0.0055461	**Sum Observations**	-0.6932633
Std Deviation	0.88941687	**Variance**	0.79106237
Skewness	0.16555248	**Kurtosis**	0.98419323
Uncorrected SS	98.095579	**Corrected SS**	98.0917341
Coeff Variation	-16036.78	**Std Error Mean**	0.07955186

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	W	0.987934	Pr < W	0.3398
Kolmogorov-Smirnov	D	0.053375	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.057657	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.348963	Pr > A-Sq	>0.2500

Figure 7: Full Model Residual Plots (1)

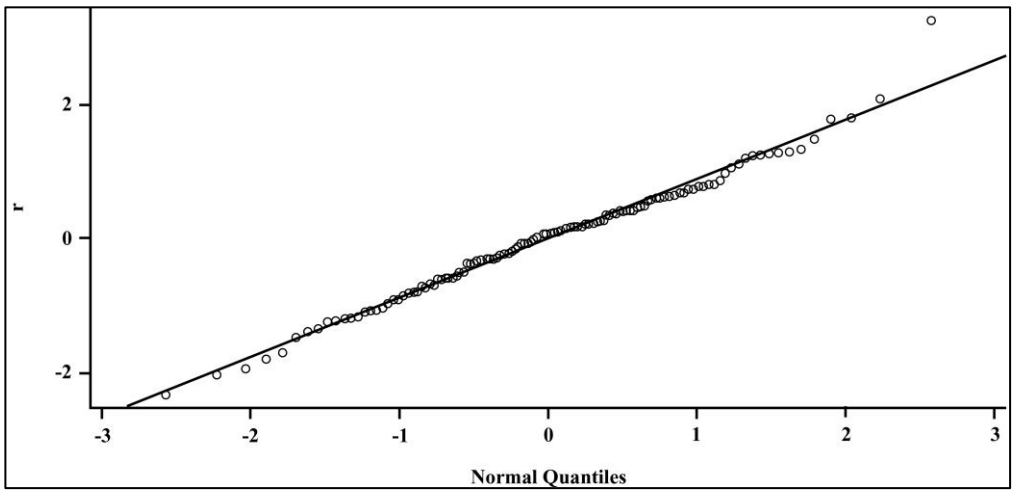


Figure 8: Full Model Residual Plots (2)

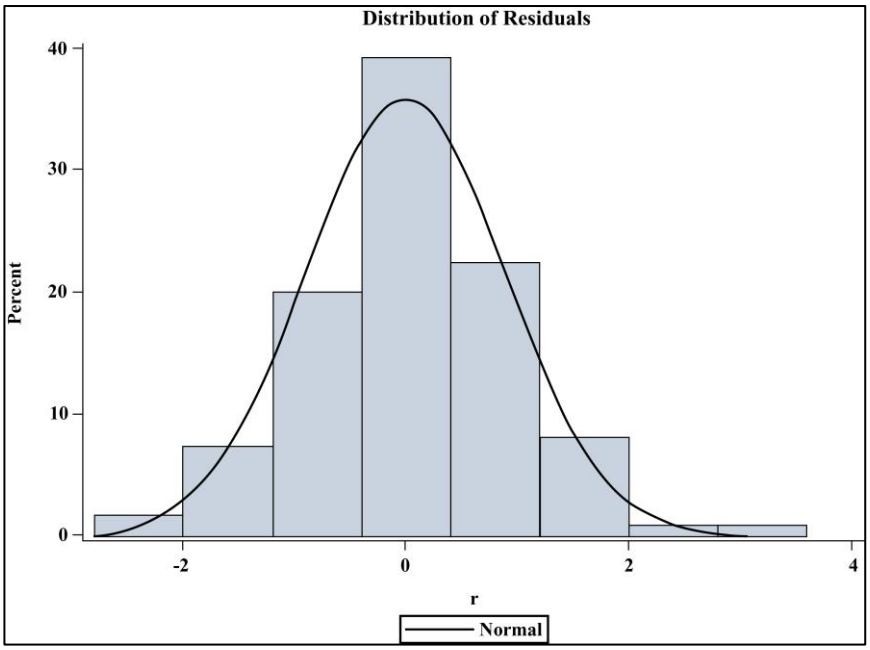
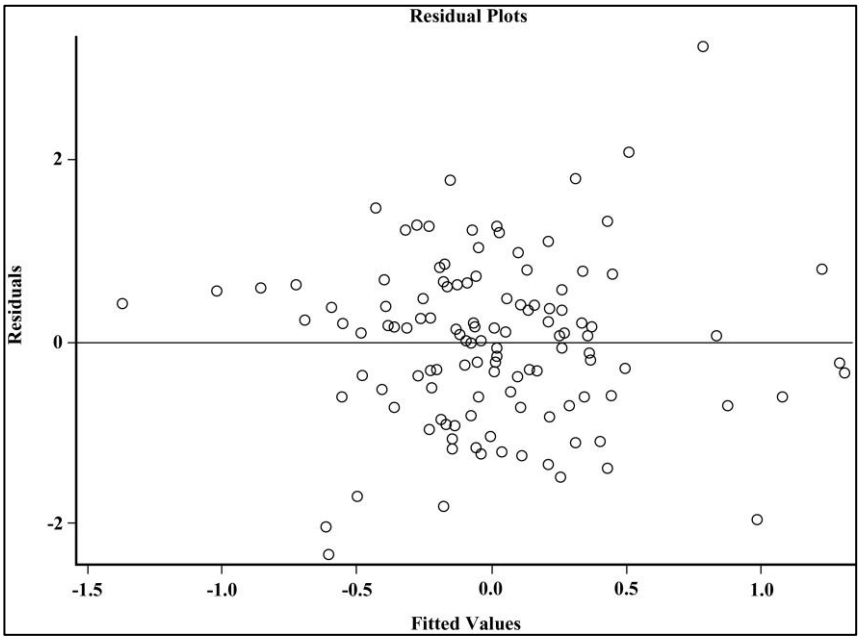


Figure 9: Full Model Residual Plots (3)



5.2.2 Initial Model (6) Fitting

Model five was appropriated to the detergent data and obtained the following results: The model was employed using a statistical analysis system termed PANAL to examine brand specific effects that vary across brands. The PANEL procedure is part of SAS/ETS software that categorises classes of linear models that arise when time series and cross-sectional data are combined. The Parks Estimation Technique was used, which considers the first-order autoregressive model with contemporaneous correlation between cross sections (Parks, 1967) to correct for first-order autocorrelation (λS_{t-1}) and obtain non-significant results (table 8) with rather large standard errors.

Table 8: Results from Fitting Full Model (6)

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand4	1	1.722434	1.5078	1.14	0.2559	ns	Omo
Price_sq	1	-0.00112	0.000662	-1.69	0.0937	ns	
X1_sqt	1	-0.09602	1.4479	-0.07	0.9473	ns	Internet
X2_sqt	1	0.011137	0.0788	0.14	0.8879	ns	OOH
X3_sqt	1	-0.18538	0.4023	-0.46	0.6459	ns	Press
X4_sqt	1	0.0946	0.0734	1.29	0.2000	ns	Radio
X5_sqt	1	0.009098	0.0239	0.38	0.7044	ns	Television
Brand1	1	-0.59049	1.1126	-0.53	0.5967	ns	Maq
Brand5	1	1.740408	1.1285	1.54	0.1261	ns	Skip
Brand6	1	-0.71051	0.7657	-0.93	0.3556	ns	Sunlight
Brand7	1	-0.99598	1.0101	-0.99	0.3264	ns	Surf
Gamma1_sqt	1	-0.02725	0.4075	-0.07	0.9468	ns	Internet*OOH
Gamma2_sqt	1	-0.02814	1.1697	-0.02	0.9809	ns	Internet*Press
Gamma3_sqt	1	0.026146	0.1214	0.22	0.8299	ns	Internet*Radio
Gamma4_sqt	1	0.001061	0.0862	0.01	0.9902	ns	Internet*TV
Gamma5_sqt	1	0.010606	0.0418	0.25	0.8001	ns	OOH*Press
Gamma6_sqt	1	-0.00444	0.00938	-0.47	0.6366	ns	OOH*Radio
Gamma7_sqt	1	0.002165	0.00377	0.57	0.5670	ns	OOH*TV
Gamma8_sqt	1	0.000726	0.0286	0.03	0.9798	ns	Press*Radio
Gamma9_sqt	1	0.001798	0.0133	0.13	0.8931	ns	Press*TV
Gamma10_sqt	1	-0.00288	0.00261	-1.10	0.2727	ns	Radio*TV

Table 9: Carryover Effects from Model (6)

Brand	*Estimate*
Maq	0.64208
Omo	-0.02225
Skip	-0.03263
Sunlight	-0.02453
Surf	0.36065

Table 8 shows large p-values (all of them greater than 0.05), which indicates that none of the variables are significant when model (6) is fitted to the data. Correspondingly, there are large estimates as well as large standard errors (Standard errors are given in the (SE column)). As model (6) concluded insignificant results throughout for all input variables (table 8), model (6) was not supported and was not retained as the appropriate emerging market model throughout the rest of the analysis of this study. It was noted, however, that the lack of visible effects might be attributed to the data limitations that were noted earlier (chapter 4). Future researchers may appropriate model (6) by using a more exhaustive dataset to isolate multimedia spend effects to yield more significant results.

5.2.3 Model Estimation Results

Due to all the variables exhibiting non-significance when fitting model (6) with the data, further analysis commenced to establish an alternative model that was representative of the significant variables influencing sales, as provided by the washing detergent data.

A series of candidate models was performed using Parks estimation (full results of the candidate models for the initial model fitting analysis can be found in Appendix 3), which tested various combinations of the independent variables with the ultimate goal of obtaining a model that exhibited the most amount of significant effects (P-values > 0.05). It was concluded with the below model resulting as the most parsimonious of all the candidate model runs and further analysis of these results continued. Significant estimates (p-

values less than 0.05) were indicated as (sig), while the non-significant estimates (p-values greater than 0.05) were indicated as (ns).

Table 10: Model with Two Media Platforms and their Interactions, Price and Brand Effects (Consumer-based brand equity)

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.199254	0.4321	2.78	0.0064	sig	Sunlight
Price_sq	1	-0.00115	0.000284	-4.07	<.0001	sig	
X4_sqt	1	0.050362	0.0179	2.81	0.0058	sig	Radio
X5_sqt	1	0.012978	0.00846	1.53	0.1276	ns	Television
Gamma10_sqt	1	-0.00154	0.000722	-2.14	0.0347	sig	Radio*TV
Brand1	1	0.023435	0.5090	0.05	0.9634	ns	Maq
Brand4	1	0.576138	0.3136	1.84	0.0687	ns	Omo
Brand5	1	2.167625	0.6322	3.43	0.0008	sig	Skip
Brand7	1	-0.30183	0.2111	-1.43	0.1554	ns	Surf

Table 11: Carryover Effects of Brand

Brand	*Estimate*
Maq	0.69406
Omo	0.08902
Skip	0.05330
Sunlight	-0.05217
Surf	0.42288

Table 10 exhibits large p-values (most of them greater than 0.05), large estimates as well as large standard errors. From the results, small p-values (<0.001) were observed for Sunlight and Skip indicating that brand equity has an effect on sales as well as price, radio, television and their respective interaction effects. Thus, the significant effects were comprehensively analysed in the following section.

5.2.4 Main/Significant Effects

Further analysis of the model continued by eliminating non-significant variables to establish only significant effects. Based on the results presented in table 10, there is strong evidence that brand equity, price, radio and the respective interaction of radio and television affects sales in emerging markets. As a general statistical rule, when a corresponding interaction term is identified as significant, the model origin thereafter needs to include both sections of the interaction term individually. It is general good practice to test and fit the candidate models with the interaction effects of both the interaction effects. Hence further analysis of the respective candidate models included both media platforms (radio and television) and their respective interaction effects.

Alternative model estimations can be designed to offer a more refined perspective on the expected evolution of the sold quantities for each brand. The model selected for analysis contained units sold as the dependent variable for the brand under review (denoted as *i*, with *i* taking values from 1 to 5), while the following variables were set as independents:

- The brand's equity.
- The square price (to account for the quadratic relationship of price and sales) per unit expressed in ZAR.
- The square roots (to account for diminishing marginal returns of advertising expenditure) of two marketing media platforms' expenditure expressed in ZAR.
- The interaction effects of two marketing media platforms where the square roots of each marketing media platform's respective expenditure is included to account for diminishing marginal returns.

The Parks Estimation Techniques (SAS) was used for the analysis considering that, besides reflecting the effects of the above-mentioned significant independent variables; it also offers insights based on the carryover effects of previous sales for each brand. Various combinations of the significant variables were tested and generated; resulting in a series of

candidate models (full results of the candidate models for the final model fitting analysis can be found in Appendix 4). From the resulting candidate models, the most suitable and parsimonious of all the models has been identified. The most suitable model is presented below:

Table 12: Parks Estimation Techniques Statistical Results

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
All Other Brands	1	0.757052	0.3272	2.31	0.0224	sig	All Other Brands
Price_sq	1	-0.00079	0.000185	-4.24	<.0001	sig	
X4_sqt	1	0.050016	0.0158	3.16	0.0020	sig	Radio
X5_sqt	1	0.019688	0.00672	2.93	0.0040	sig	Television
Gamma10_sqt	1	-0.00138	0.000628	-2.19	0.0305	sig	Radio* Television
Brand5	1	1.355338	0.3982	3.40	0.0009	sig	Skip

From the five media channels under review, namely television, press, out-of-home, radio and internet, only two of these platforms were found to be significant, along with their multi-effect variable. Brand equity and price were also significant variables and were kept in the model. For each brand, the carryover effect was calculated as presented below:

Table 13: Carryover Effects of Brand

Brand	*Estimate*
Maq	0.67202
Omo	0.13520
Skip	0.07604
Sunlight	-0.03002
Surf	0.41757

Considering that brand No. 5's (Skip) coefficient is different than the coefficients of the other brands and that each brand owns its corresponding carryover effect, the resulting model is presented below distinctly for each brand for ease of application:

1. **Sales Next Week** $_{\textbf{Brand 1}}$ = 0.757052 - 0.00079* Price_Sq + 0.050016* Radio_Sqt + 0.019688* TV_Sqt - 0.00138 * (Radio_Sqt*TV_Sqt) + 0.67202* Sales Last Week $_{\text{Brand 1}}$

2. **Sales Next Week** $_{\textbf{Brand 2}}$ = 0.757052 - 0.00079* Price_Sq + 0.050016* Radio_Sqt + 0.019688* TV_Sqt - 0.00138 * (Radio_Sqt*TV_Sqt) + 0.13520* Sales Last Week $_{\text{Brand 2}}$

3. **Sales Next Week** $_{\textbf{Brand 3}}$ = 0.757052 - 0.00079* Price_Sq + 0.050016* Radio_Sqt + 0.019688* TV_Sqt - 0.00138 * (Radio_Sqt*TV_Sqt) + 0.07604* Sales Last Week $_{\text{Brand 3}}$

4. **Sales Next Week** $_{\textbf{Brand 4}}$ = 0.757052 - 0.00079* Price_Sq + 0.050016* Radio_Sqt + 0.019688* TV_Sqt - 0.00138 * (Radio_Sqt*TV_Sqt) - 0.03002* Sales Last Week $_{\text{Brand 4}}$

5. **Sales Next Week** $_{\textbf{Brand 5}}$ = 1.355338 - 0.00079* Price_Sq + 0.050016* Radio_Sqt + 0.019688* TV_Sqt - 0.00138 * (Radio_Sqt*TV_Sqt) + 0.41757* Sales Last Week $_{\text{Brand 5}}$

These results promoted the final fitting of the model discussed in the following section.

5.2.5 Final Model Fitting

Based on the results of table 12, it can be concluded that the final statistical model that is effective for emerging markets was revealed. However, before concluding the final model the following was noted:

- With Skip's significant influence as a brand on sales, consumer-based brand equity is thus proven as a statistically significant variable in influencing sales and, as such is reflected in the final model formulation (as it did in model (6) as α_i. α_i represents the respective brand co-

efficient obtained for each respective significant brand *i* (in this case, Skip). Brand effect/influence varies across brands but is constant over time (Refer to chapter 2 for a detailed explanation).

Considering price, P, the lagged/auto-regressed Sales variables, $S_{i,t-1}$, and the media, x_k where $u_k = \sqrt{x_k}$. The resulting model (7) is adapted for the remainder of the study and is concluded for emerging markets. Model (7) is defined as follows:

$$S_{it} = \alpha_i + \theta * {P_{it}}^2 + \beta_1 u_1 + \beta_2 u_2 + \kappa_{12} u_1 u_2 + \lambda_i S_{i,t-1} + \upsilon_{it} \quad (7)$$

Where:

- S_{it} is sales at time t.
- α_i represents the respective brand co-efficient obtained for each respective significant brand i. (Brand effect or brand influence that varies across brands but is constant over time).
- θ is the effect of brand i's price.
- P_{it} is price of the brand i at time t where P*2 represents the relationship between price and sales being curved in nature.
- $\beta_1 + \beta_2$ is unequal effectiveness parameters for each advertisement media and is constant across brands.
- $u_1 + u_2$ represents two marketing media platforms.
- $\kappa_{12} u_1 u_2$ is the interaction effect of the two marketing media platforms (u_1, u_2 respectively).
- $S_{i,t-1}$ is the sales in the previous time period for brand i (there are five brands).
- λ_i is carryover effect for each brand (how influential past sales have been to current sales).
- ϑ_{it} is a normally distributed composite error term that consists of two components (the brand specific error component σ_i^2, and the error component σ_e^2), where $\alpha_i = \alpha_i + \epsilon_i$ and $\epsilon_i \sim N(0, \sigma_i^2)$; and $\vartheta_{it} \sim N(0, \sigma_e^2)$; and ϵ_i and ϑ_{it} are independent.

For all S_i where the brand does not match the *ith* brand then treat that S_i as 0.

5.2.5.1 Concluding Results – Model (7) Application

As evidenced in both the results (table 12) and derived model (7), only one interaction effect was deemed significant, and, when incorporated into the main model the results confirmed the multi-effect variable significance (table 12). The insignificance of the remaining four interaction effects could be due to the powerful impact of the two most significant variables—that being brand equity and price—the verification of interaction effects is essential for organisations, especially where more profound analysis can be performed on more consistent databases (containing a lower number of zero valued cases) as well as the interaction between all media platforms (not being restricted to pairwise interactions). In some cases, the combination effect of two or more marketing channels can generate higher returns than when applied independently, under no clear packaged strategy.

Correspondingly, with two of the five analysed media platforms having respective significance, the limited results of media platform significance in emerging markets could also resultantly be due to the extremely powerful impact of brand, price, radio and television, inasmuch as any other significant variables being overridden or, due to the null value data limitations that were discussed in chapter 4 of this study. The remaining three platforms (internet, press and out-of-home) should not be disregarded too hastily and marketing and brand managers should perform further analysis on their data to ensure no other media platform exists before applying model (7) to determine optimal IMC strategies (discussed in the ensuing section).

A consequence of the significance of brand equity, price and, only two media platforms with its respective synergistic effects is that the final model differs from Naik and Raman's (2003) model, as model (7) incorporates the notion that besides marketing media platforms and their respective interaction effects, brand equity and price are the overridingly significant influences in determining sales in emerging markets.

5.2.6 Model Comparison

The goal of model selection is to select the most parsimonious model supported by the observed data, however, based on the results (Table 12), there is strong evidence that brand equity and price affect sales in emerging markets. A consequence of this is that our final model (6) differs from Naik and Raman (2003)'s model (1) and, therefore cannot do any comparison to determine model superiority. Future researchers can explore this area more in more detail.

5.3 Normative Analysis

Normative analyses are presented to address the concerns of an optimal IMC Strategy given the significant effects of brand, price, radio, television and their respective synergistic effects on sales. It became evident that de to the insignificant and inconclusive results of the remaining media platforms in the South African market, that an optimum media schedule could still be viable for the three remaining platforms (internet, press and out-of-home). These three respective media platforms are discussed in terms of inclusivity and optimal media schedules in later sections of this research report. The decision maker's problem is now formulated and the optimal pricing and IMC strategy are respectively derived.

5.3.1 Decision Maker's Problem

Normative analysis is presented to address substantive issues concerning optimum media scheduling, pricing and budgetary strategies within emerging markets. Although it is apparent that brand managers are concerned with the optimal media mix of all five media platforms and the affiliated budgets thereof, given the insignificance of three of these media platforms and, four interaction effects within the above analysis, the implications and optimal IMC strategy formulation for the optimal media mix are discussed in chapter 6, where it is assumed that model (6) yields the more superior model in determining sales in emerging markets and therefore applies the respective

theory thereafter in order to guide future researchers, should their respective dataset be more conclusive with continuous advertising spend across multiple platforms.

It was found that brand, price, radio, television and their synergistic effects are strong predictors of units sold in emerging markets (Including television as a media variable in model (7). However, an advertiser's decision-making problem is to determine the total budget and its allocation to various communication activities and to determine the optimal pricing strategy that will maximise sales within the firm's parameters as presented in model (7). These problems are addressed in the following section.

5.3.2 Optimal Pricing and IMC Strategy

As discussed in the aforementioned section where the assumptions of model (7) were noted, there must be specific mention made of the following before deriving the optimal pricing and IMC strategy:

- α_i is the brand effect/influence that varies across brands but is constant over time. Due to α_i being constant over time, the inclusion of α_i proves to be futile and inconsequential in its significance in the derivation of the optimal pricing and IMC strategy and, as such, is removed when the optimal pricing and IMC strategy formulation is derived.
- ϑ_{it} is a normally distributed composite error term that consists of two components (the brand specific error component σ_i^2, and the error component σ_e^2), where $\alpha_i = \alpha_i + \epsilon_i \text{ and } \epsilon_i \sim N(0, \sigma_i^2)$; and $\vartheta_{it} \sim N(0, \sigma_e^2)$; and ϵ_i and ϑ_{it} are independent. As such, similar to the notation above on the variable α_i, the inclusion of ϑ_{it} proves to be futile and inconsequential in its significance with the derivation of the optimal pricing and IMC strategy and, as such, is removed when the optimal pricing and IMC strategy formulation is derived.

$$S_{it} = \alpha_i + \theta * {P_{it}}^2 + \beta_1 u_1 + \beta_2 u_2 + \kappa_{12} u_1 u_2 + \lambda_i S_{i,t-1} + \upsilon_{it} \quad (7)$$

Based on model (7)'s regression model the rate of change of sales from one period to the next can be constructed to be:

$$\frac{\partial S}{\partial t} = \lim_{\Delta t \to 0} \frac{\Delta S_t}{\Delta t} == \theta * P^2 + \beta_1 u_1 + \beta_2 u_2 + \kappa_{12} u_1 u_2 + \lambda_i S_{i,t-1} - S_{t-1}$$

Essentially this equation states that to find the change in sales the current period sales subtract the sales from the previous period (the subtraction is the last term, S_{t-1}). The first part is the regression equation, which predicts the sales for the new period. The remainder of the study uses Naik and Raman's (2003) mathematical processes outlined in their publication in order to substantiate further derivations of extended models.

Next, the Hamiltonian (Naik and Raman, 2003) is defined as:

$$HH(P, u_1, u_2, \mu, S) = P * S_{t-1} - u_1^2 - u_2^2 + \mu\big(\theta * P^2 + \beta_1 u_1 + \beta_2 u_2 + \kappa_{12} u_1 u_2 + \lambda_i S_{i,t-1} - S_{t-1}\big) \quad (8)$$

5.3.2.1 Optimal Pricing Strategy

The Hamiltonian needs to be optimised to find the ideal selling price that maximises profit for this regression model.

$$\frac{\partial H}{\partial P} = S_{t-1} + 2\mu\theta P = 0$$

$$P = \frac{-S_{t-1}}{2\mu\theta} \quad (9)$$

Next,

$$\frac{\partial \mu}{\partial t} = \rho \mu_i - \frac{\partial H}{\partial S}$$

At equilibrium, this should be $\frac{\partial \mu}{\partial t} = 0$ and there is also from (8),

$$\frac{\partial H}{\partial S} = P' * S + P * 1 + \mu(\lambda_i - 1)$$

And from (9),

$$P' = \frac{-1}{2\mu\theta}$$

Hence,

$$\frac{\partial H}{\partial S} = \frac{-1}{2\mu\theta} * S_{t-1} + P * 1 + \mu(\lambda_i - 1)$$

Then,

$$\frac{\partial \mu}{\partial t} = \rho \mu_i - \left(\frac{-1}{2\mu_i\theta} * S_{t-1} + P * 1 + \mu(\lambda_i - 1)\right)$$

Substitute in (9),

$$= \rho \mu_i - \left(\frac{-1}{2\mu_i\theta} * S_{t-1} + \frac{-S_{t-1}}{2\mu\theta} * 1 + \mu(\lambda_i - 1)\right) = 0$$

After some algebra,

$$\mu_i^2(\rho - \lambda_i + 1) + \frac{S_{t-1}}{\theta} = 0$$

The quadratic formula is applied to get

$$\mu_i^* = \pm\sqrt{\frac{-S_{t-1}}{\theta(\rho - \lambda_i + 1)}}$$

Finally, this is substituted back into (9) to get:

$$p_i^* = \frac{-S_{t-1}}{2\mu_i^*\theta} = \frac{-S_{t-1}}{2\theta}\frac{1}{\pm\sqrt{\frac{-S_{t-1}}{\theta(\rho-\lambda_i+1)}}} = \frac{\pm S_{t-1}}{2\theta}\sqrt{\frac{\theta(\rho-\lambda_i+1)}{-S_{t-1}}} \qquad (10)$$

Notice that there are two solutions and the one that gives the positive price should be selected, which will most likely be the positive version. If these are both positive it may indicate that there two different optimal prices (perhaps a strategy that goes after price sensitive customers and attempts to sell on volume and another strategy that targets customers who want a high quality product and are willing to pay for it).

Thus there is an optimal price for each of the *ith* brands based on the regression parameters, the discount rate ρ and the previous period's sales S_{t-1}.

5.3.2.2 Optimal Media Schedule and Budgetary Consideration

In order to find the optimal media spends, similarly to the pricing strategy solution, the Hamiltonian is optimised such that:

$$\frac{\partial H}{\partial u_1} = 0 = -2u_1 + \mu_i^*(\beta_1 + \kappa_{1,2}u_2)$$
$$\frac{\partial H}{\partial u_2} = 0 = -2u_2 + \mu_i^*(\beta_2 + \kappa_{1,2}u_1)$$

Next, this is converted to matrix form to solve this system of linear equations:

$$A\vec{u} = \vec{b}$$

Where:

$$A = \begin{bmatrix} -2 & \mu_i^*\kappa_{1,2} \\ \mu_i^*\kappa_{1,2} & -2 \end{bmatrix}, \vec{u} = \begin{bmatrix} u_1 \\ u_2 \end{bmatrix}, \vec{b} = \begin{bmatrix} -\mu_i^*\beta_1 \\ -\mu_i^*\beta_2 \end{bmatrix} \qquad (11)$$

Following Naik and Raman's (2003) approach for optimising a system of linear equations, Cramer's Rule is applied to (11). Cramer's Rule is used to solve a system of linear equation. In the context of media advertising the variables of interest are total expenditure for each media. Hence Cramer's

Rule can be used to determine total expenditure of each media of interest given the parameters. Using Cramer's Rule to solve (11) it follows that the optimal solutions for each media spend are provided below.

$$u_1^* = \frac{\det(A_1)}{\det(A)} = \frac{det\begin{bmatrix} -\mu_i^*\beta_1 & \mu_i^*\kappa_{1,2} \\ -\mu_i^*\beta_2 & -2 \end{bmatrix}}{det\begin{bmatrix} -2 & \mu_i^*\kappa_{1,2} \\ \mu_i^*\kappa_{1,2} & -2 \end{bmatrix}} = \frac{\beta_2\kappa_{1,2}(\mu_i^*)^2 + 2\beta_1\mu_i^*}{4 - (\mu_i^*)^2(\kappa_{1,2})^2} \quad (12)$$

$$u_2^* = \frac{\det(A_2)}{\det(A)} = \frac{det\begin{bmatrix} -2 & -\mu_i^*\beta_1 \\ \mu_i^*\kappa_{1,2} & -\mu_i^*\beta_2 \end{bmatrix}}{det\begin{bmatrix} -2 & \mu_i^*\kappa_{1,2} \\ \mu_i^*\kappa_{1,2} & -2 \end{bmatrix}} = \frac{\beta_1\kappa_{1,2}(\mu_i^*)^2 + 2\beta_2\mu_i^*}{4 - (\mu_i^*)^2(\kappa_{1,2})^2} \quad (13)$$

Finally the Total Budget, B can be found together with the proportion/mix of the budget that should be spent on each category, Λ_k for the optimal IMC strategy.

To obtain the total optimal budget (B) the system of equations is combined (12 & 13) to obtain:

$$B = \sum_k^2 (u_k^*)^2 = \sum_k^2 x_k^* = x_1^* + x_2^* \quad (14)$$

Similarly, to obtain the optimal IMC strategy and optimal media mix, Λ as:

$$\Lambda_k = \frac{x_k^*}{x_1^* + x_2^*} \quad (15)$$

In practice, advertisers should estimate the model parameters for their specific brand in a given market by applying a suitable estimation approach (The Kalman Filter Estimation is proposed, based on Naik & Raman (2003) research) and then they should determine the optimal budget and media mix equations from (14) and (15) respectively.

5.4 Conclusion

This chapter presented the results from the analysis of secondary data conducted for the purpose of this research. The significant variables influencing sales is that of brand, price, radio, television and their respective synergistic effects (table 12). The other variables of marketing media platforms (internet, press, and out-of-home), synergy and carryover effects were considered considerably less significant in conjunction with the dramatic influence of the significant variables outlined above in estimating and predicting levels of sales.

The results presented in this chapter are compared to the literature presented in chapter 2 in order to draw conclusions regarding the propositions suggested in chapter 3. These findings are discussed in the following chapter.

CHAPTER 6: DISCUSSIONS & MARKETING IMPLICATIONS

The increase/decrease in units sold through the influence of marketing media platforms and, their synergistic effects, price and consumer brand equity are fundamental parts of advertisers' budgetary constraints and media scheduling. The objective of this research was to investigate the variables that were significant in influencing sales and to determine the optimal media schedule and pricing strategy for brands promoting a particular brand/product/service in the South African market. The proposed model, with significant effects being estimated using Parks Estimation Techniques estimation to fit and validate the model, the resulting variables of brand equity, price, radio, television and their interaction effects, were proved to be the most significant indicators with the highest impacts on sales in emerging markets. The particularities of emerging markets of being exceptionally brand conscious, price sensitive and having an exposure and penetration of over 90% to television and radio, the resulting outcome differs from that of developed market models (Notably, model (1) by Naik and Raman, 2003).

The literature reviewed in chapter 2 provided insight regarding the extension of model (1) in that it promoted the inclusion of specific variables that were perceived to be influential in driving and promoting sales in emerging markets. The perceived influential variables (being that of selected marketing media platforms and their respective synergistic effects, consumer-based brand equity and price) supported the final literature model iteration (6) and led to the development of four propositions presented in chapter 3. The discussion in this chapter uses these propositions as the basis for which to compare the results gathered from the secondary data analysis with the findings presented by the model and insights from chapter 2.

6.1 Proposition 1: Marketing Media Platforms are unequal in effectiveness and significant in influencing sales in emerging markets

After performing a series of statistical tests and modeling, the hypothesis announced at the beginning of the analysis has been confirmed. Consumers behave differently in emerging markets than they do in developed economies (Rishi, 2012; Sheth, 2011). Although two media platforms (radio and television) and their respective synergistic media effects with one another were concluded to have significant effects in influencing sales, consumer-based brand equity and price resulted as the most significant variables influencing purchase behavior in emerging markets. These results corroborated the findings from model (1) by Naik and Raman (2003) inasmuch as it concluded marketing media effects and respective interactions; however, the effects were seen to have behaved differently to models derived in developed markets in terms of their respective effectiveness. Media platform effectiveness proved contrary to the 'equal' assumptions made by Rishi (2012) and Naik and Raman (2003). The significance and effectiveness of both marketing media platforms and their respective interactions are discussed in more detail in the following section.

6.1.1 Marketing Media Platforms

Supporting both the results and literature reviewed in chapter 2, this study furnished strong support for the significant influence of marketing media platforms namely, radio and television, in determining the level of sales for a firm in emerging markets and, as such validated proposition 1 in this study. Contrary to model (6) however, only two marketing media platforms proved significant namely, radio and television.

6.1.1.1 The Platforms

The results of this study were hardly surprising given that radio and television have over 90% reach and penetration within the South African marketplace

(figure 1). It is worth mentioning however, that out-of-home, press and internet led to relatively inconclusive results given the low percentage of non-null values within the analysed time frame (table 4). With both television and radio benefitting from more consistent data coverage and correlating with quantities sold, it was not surprising that both media platforms came out as statistically significant variables influencing sales. With only two of the five media platforms proving significant (table 12), this study supports the notion that media platforms inevitably yield unequal effectiveness in their influence on sales in emerging markets. Whilst typical developed market models assume equal media effectiveness (Rishi, 2012; Naik & Raman, 2003; Naik, Raman & Winer, 2005) in their influence on sales, the results of this study furnishes strong support for the inconsistency in effectiveness of various media platforms in emerging markets.

The results are supportive of the notion that the South African market exhibits predominant marketing media platforms that are proven to have significant reach and penetration amongst the mass population. Correspondingly, it can be concluded that not all media platforms are equally effective in their advertising efforts and, as such, the unequal effectiveness accounted for in both model (6) and (7) of each respective media platform is valid in terms of more accurately predicting sales levels in emerging markets.

With the global convergence and amalgamation of mass media platforms (with corresponding synergistic effects), media consumption patterns have most definitely been altered and this is evidenced in the study's findings that, according to (Rishi, 2012)**,** with the rising purchasing power of emerging market consumers, that consumers are increasingly experiencing more interactive media platforms than traditional ones such as newspapers and magazines (press). Emerging markets are characterised by low media reach for specific media platforms and South Africa is no exception to this. With television and radio reaching over 90% of the population, press reaching 55% of the population and internet reaching just over 35% of the population (figure 1) it was anticipated that mediums with a wider reach would have a larger effect and influence on sales. With the South African market clearly exhibiting

predominant marketing media platforms that have significant reach and penetration amongst the mass population, the results of this study confirm that television, radio, press, out-of-home and internet significance directly correlate with the media platforms identified by SAARF (2014) as being the most influential mediums (figure 1).

The results support the study conducted by Henningsen, Heuke and Clemment (2011) in that it reaffirms the need and, almost necessity, of marketers and advertisers to assume that differing media platforms bring about different results due to the varying levels of immediate feedback, personalisation and message complexity of each platform. For instance, the insignificance of press and internet within this study could inherently be attributed to the literature by Rishi (2012) and Sheth (2011) who emphasised the varying literacy levels, language barriers and established social and economic constraints that many typical South African consumers face, which could ultimately be seen to have inhibited these two media platforms from being effective, let alone significant within this market.

Although the inconsistency of advertising spend (table 4) through each media platform could have inhibited the results of each medium's potential influence, the findings that only two of the five marketing media platforms are significant in influencing sales in emerging markets, has substantiated the notion that global companies cannot afford to purely replicate developed market strategies by targeting the same media platforms that have proven successful in developed markets and anticipate the same or similar results as previously experienced. The results of this study support findings from Henningsen, Heuke and Clemment (2011) that marketers and advertisers must assume that differing media platforms bring about different results as the results support the view that advertising efforts (that are expended through various marketing media platforms) are not necessarily similar in their results and the effects they produce. As such, managers have various factors to consider when determining the best course of action when allocating their respective marketing budget to marketing media platforms. This study addressed such issues in emerging markets by providing a theoretically sound model that is

able to guide marketers regarding their optimal budgeting and IMC strategy (models (14) and (15)) in determining and estimating optimal sales levels within their respective firms.

Despite the theoretical application derived in this study, it is clearly evidenced by the results that marketers who seek to increase 'external influences' by advertising in order to stimulate growth of their specific products/services, need to leverage the benefits of radio and television whilst not ignoring or compromising the positive effects that can be evidenced from the other three effective media platforms (press, out-of-home and internet). By identifying and capitalising on radio and television as the most significantly influential mediums when determining brand campaigns and affiliated schedules, brand managers can expect to acquire increased brand awareness, association and, correspondingly brand equity, which is considered to be the foundation for brand loyalty. Once this loyalty is achieved, this medium inadvertently assists in promoting repeat purchase behaviour from consumers and generates greater revenues for firms.

6.1.1.2 The Constraints

The insignificance of four of the media platforms could be attributed to the data constraints this study faced, which led to relatively inconclusive results for many of the media platforms given their respective low percentage of non-null values within the analysed time frame. However, other social and economic constraints that were identified and discussed in the literature review were considered, as these may have correspondingly impacted and influenced the results of this study.

The constraints identified and outlined in the aforementioned literature by Sheth (2011) and Rishi (2012) emphasised the physical and monetary constraints, social expenditures, mobility limitations and distribution inefficiencies that emerging market consumers face and, as such, the results of this study did not conclude the significance of all five media platforms. These results support the notion (and possibly reality) that a significant portion of emerging market consumers face constraints that restrict their exposure to

typically targeted advertising media platforms. Radio is the most accessible and affordable marketing media platform and, as such, the statistical insignificance of press and internet could be a direct result of consumers being constrained by disposable incomes (affordability) and accessibility to such media platforms, which prohibits such marketing media platforms from being effective as they are considered relatively more expensive (magazine and newspaper printing and distribution costs and broadband costs) and less accessible due to distribution inefficiencies and possible infrastructural outlay inadequacies (availability and accessibility to outlets selling related press material; limited infrastructural outlay of telecommunication foundations and affiliated costs).

Constraints relating to accessibility, affordability and availability of marketing media platforms may be the corresponding result of the insignificance of each respective media platform and, correspondingly, the results furnish support that technologically advanced marketing mediums (internet) that developed markets typically target are not evidenced as being influential as yet in emerging markets. Emerging markets face the constraints and the additional challenge of expanding and fragmented advertising media platforms, marketing and brand managers have numerous factors to consider when determining the best course of action when allocating their respective marketing budget. However, given the study's support that radio and television are the most effective and significant media vehicles influencing sales in emerging markets, marketing and brand managers are urged to consider the social and economic constraints evident in emerging markets when utilising these platforms more extensively.

6.1.2 Interaction Effects of Marketing Media Platforms

Interaction effects and their influence on the dependent variable (units sold) yielded one significant interaction and relatively non-significant results for most of the other pairwise media interactions. With the analysis aiming to ascertain whether any of the pairwise interaction effects between the five media platforms, should be brought into the main model, one significant multi-effect was obtained by combining two significant effects (radio and television).

With a p-value of 0.0305, radio and television spend calculated together offer a uniquely significant contribution to the evolution of sales, which is not surprising as Radio and television reach over 90% of South Africa's population and thus, it is no surprise that these two interaction terms proved statistically significant when compared to the other platform interactions. The interpretation of the results would lead to the idea that for every increase of a combined radio-television spend, the units sold increased by the resultant unstandardised coefficient (-0.00138).

With the aptly described definition by the American Association of Advertising Agencies (Shultz, 1993) recognising the value added aspect of IMC that is created by the joint impact of multiple activities (television, print, out-of-home, radio and internet advertising) this study reinforces the relative enormity of the effects of media synergy. True to Naik and Raman's (2003) synergistic model development (model 1), this study further supports the insight that marketers need to spend more time concentrating on cross-media synergies where the collective and combined effect of multiple activities may often exceed the sum of their individual effects.

6.1.3 Optimal IMC Strategies

With the significance of radio and television being influential variables within the context of the South African washing detergent market, this market is concluded to be increasingly receptive to communications made through the use of these platforms. With model (7)'s concluding theoretical validity, the application of the model when applying this media platform gives theoretical insight into a brand's optimal budgeting process and media schedule (model 14 and 15 respectively) when firms attempt to optimise their sales and monetise their offerings. The optimal media schedule takes into consideration the media effectiveness of radio and television within emerging markets, which according to aforementioned discussion on media platforms and constraints may be attributable to access, affordability and availability of this media platform to the mass population as well as its 90% penetration and reach within the South African marketplace.

Although model (7)'s extension to a theoretical formulation of optimal media scheduling and budgetary allocations, the results of the study only allowed for the optimisation of two media platforms, namely radio and television. It is believed that given an exhaustive dataset for advertising spend across all mentioned mediums, that the application of model (6) could be validated through the use of fitting this comprehensive dataset, which would ultimately be able to provide more rigorous and dynamic theoretical results for marketers and future researchers on the topic of marketing media and their respective synergistic significance in its influence on sales in emerging markets. Given the interest and the apparent mass media amalgamation and media consumption pattern changes in emerging markets (Rishi, 2012), this study further discusses optimal IMC strategy solutions based on model (6) due to marketers' interest and, its affiliated optimal model solutions are presented in the results section under proposition 4 (the retention of model (6)).

The study derived a theoretically sound optimal IMC strategy (model 14: budgeting solution and, model 15: media schedule, presented below for sake of easier referencing) in the aforementioned results section. However, when the washing detergent category data was applied and tested using these models, confounding results were obtained with cases exhibiting negative advertising spends (See results of data application to models (14) and (15) in table 14 and 15 respectively).

Optimal Budget for model (6) given by:

$$B = \sum_k^2 (u_k^*)^2 = \sum_k^2 x_k^* = x_1^* + x_2^* \qquad (14)$$

Optimal Media Mix Λ for model (6) given by:

$$\Lambda_k = \frac{x_k^*}{x_1^* + x_2^*} \qquad (15)$$

Table 14: Model (14) optimal budgetary solution results from washing detergent brand (Omo) (South African Rands (ZAR))

Brand	$\sqrt{Radio\ Spend}$	$\sqrt{TV\ Spend}$	Radio Spend (in 10,000s)	Television spend (in 10,000s)	Total Budget (in 10,000s)
Maq	- 1.00	-1.01	0.99	1.03	2.02
Omo	-1.00	- 1.01	1.00	1.03	2.03
Skip	-1.00	- 1.02	1.00	1.04	2.04
Sunlight	- 1.00	- 1.01	1.00	1.02	2.02
Surf	- 0.99	- 1.00	0.99	1.01	2.00

Table 15: Model (15) optimal budgetary solution results from washing detergent brand (Omo) (South African Rands (ZAR))

Brand	Total Budget (in 10,000s)	Radio Proportion of Budget	Television Proportion of Budget
Maq	2.02	49.18%	50.82%
Omo	2.03	49.45%	50.55%
Skip	2.04	49.00%	51.00%
Sunlight	2.02	49.59%	50.41%
Surf	2.00	49.43%	50.57%

These results led to the scrutiny of Naik and Raman's (2003) optimal media schedule and budgetary strategy solution (model 16 and 17 presented below) that was derived to establish where the inconsistencies in the application of model (14) and (15) lay. Naik and Raman's (2003) optimal budgetary solution is given by:

$$B = \frac{(\beta_1 + \beta_2)m}{2(1 + \rho - \lambda) - \kappa m} \qquad (16)$$

and their optimal media mix strategy by:

$$\Lambda = \frac{2\beta_1(1 + \rho - \lambda) + m\beta_2\kappa}{2\beta_2(1 + \rho - \lambda) + m\beta_1\kappa} \qquad (17)$$

When using the same detergent category data with Naik and Raman's (2003) optimal media and budgeting strategy the optimal strategy solutions for both

were just as confounding as the current research study's model application results. This questions the reliability of the practical application of Naik and Raman's (2003) optimal media and budgetary strategy solutions (See table 16 for results of data application to models (16) and (17)). The confounding and unrealistic results (table16) infer that when applying developed market models to real emerging market scenarios the notion that developed market models differ substantially in their effective and successful application is effectually, reaffirmed.

Table 16: Model (16) and (17) optimal media schedule and budgetary solution results from washing detergent brand (Omo) (South African Rands (ZAR))

Brand	Total Budget (in 10,000s)	Media Mix (Radio/Television)
Maq	- 1.87	0.98
Omo	- 1.89	0.99
Skip	-1.90	0.98
Sunlight	- 1.89	0.99
Surf	- 1.88	0.99

This led to the conclusion that the estimated "m", marginal profit in their model (represented in model (14) and (15) by price), has to be less than $0.5 for the model to be successfully calculated and provide solutions that are reasonable or positive.

Given the theoretical soundness and validity of models (14) and (15) when determining optimal media schedules and budget allocation, the practical application is considered flawed. With these results, the flaws were concluded to be attributed to the regression model not accurately reflecting the nature and impact of pricing and advertising. It was proposed that other non-regression techniques such as sampling from the data were performed to find best results. With the flawed nature of the theoretical models in their practical application to real life marketing situations, the study focused on other methods that could be used to determine the optimal media schedules and budgeting allocation thereof. The methods and suggestions are discussed in the following section.

6.1.3.1 Alternative Marketing Approaches for IMC strategy Optimisation

Although this research study was primarily concerned with an alternative optimal media schedule, the alternative method and approach proposed brings in price correspondingly and, as such, the alternative method and approach calculates a differing optimal pricing strategy to that reviewed previously (model 10). This is discussed further herein under the section discussing proposition 4.

Alternative Application 1

A Bayesian type approach was used to estimate each brand's optimal price and optimal media spend mix. The idea behind Bayesian statistics is to use the posterior distribution (the data that was gathered) to make inferences and predictions on the prior distribution (in this case the spend distribution and the price). For this Bayesian approach it was first required to define the function that was being optimised. Specifically, this is the percentage change of the profit function, which is detailed below:

$$Profit = Price * Quantity - Costs$$

$$\%\ change\ in\ Profit = \frac{Profit_{current} - Profit_{previous}}{Profit_{previous}} \qquad (18)$$

It is desired that the percentage change in profit function is maximised because price and media spend should drive new sales. However, it is not desirable to spend more on advertising than is received in additional sales so profit provides a method to bring this function into balance.

The data contains both price and quantity sold and as such the only costs that are considered are the advertising spend. Since it is suspected that advertising has both a long-term and a short-term effect, the cost is decided to be equivalent to half the spending in the current month plus half the spending from last month.

To implement the above equations, each data point was analysed and the profit formula was applied. The three months that had the highest percentage change in profit for each brand were then found (hence finding the maximum in our posterior distribution) and these prices were averaged and the media spend categories of each optimal media spend and price were determined (from the prior distribution). The results are displayed in the tables below:

Table 17: Optimal media spend, price and budget (South African Rands (ZAR))

Brand	Price	Internet Spend	Outdoor Spend	Press Spend	Radio Spend	Television Spend	Total Budget
Maq	R35.72	R -	R659,459.33	R129,858.00	R 795,304.83	R1,570,616.67	R3,155,238.83
Omo	R43.09	R -	R341,618.17	R -	R 10,330.33	R 521,258.33	R 873,206.83
Skip	R48.18	R -	R460,637.67	R 30,800.00	R -	R 385,916.67	R 877,354.33
Sunlight	R35.95	R -	R220,125.50	R 10,241.67	R 411,725.67	R 303,000.00	R 945,092.83
Surf	R31.99	R -	R298,818.33	R 12,883.33	R1,274,779.00	R5,265,805.00	R6,852,285.67

Table 18: Optimal media spend, price and budget (% of budget)

Brand	Internet Spend Proportion	Outdoor Spend Proportion	Press Spend Proportion	Radio Spend Proportion	Television Spend Proportion
Maq	0.00%	20.90%	4.12%	25.21%	49.78%
Omo	0.00%	39.12%	0.00%	1.18%	59.69%
Skip	0.00%	52.50%	3.51%	0.00%	43.99%
Sunlight	0.00%	23.29%	1.08%	43.56%	32.06%
Surf	0.00%	4.36%	0.19%	18.60%	76.85%

The model assumes the only long-term effect of advertising was one month into the future. This might not be realistic so a future improvement on the model could be to change the costs function to account for a longer effect of advertising and a longer distribution of the costs of advertising over time. Additionally, there could be other cost effects not accounted for in this model.

Alternative Application 2

From the results of the significant variables influencing sales in emerging markets (table 12) and their respective brand models (which identifies the coefficients of the significant variables) derived thereafter (essentially Model (7) applied to each respective brand), marketers are able to assimilate the proposed values they have for their respective media and pricing strategy and, correspondingly be able to determine the level of sales their firm should derive based on the proposed marketing media spend and pricing strategy. An application of model (7) with the washing detergent category is given below:

Example 1: Considering the OMO Brand at a ZAR45 price per unit (ZAR2,025 Price_Sq), Sales Last Week at 250,000 units and ZAR900 TV_Sqt spending, the sales of next week will be:

Sales Next Week $_{OMO}$ = 0.757052 - 0.00079* 2,025 + 0.050016* 0 + 0.019688* 900 - 0.00138 * (0*900) + 0.13520* 250,000
= 0.757052 – 1.59975 + 17.7192 + 33,800
= 33,816.88

Taking this new estimation of weekly sales, the following week could be forecasted as well, and this could be replicated (the prediction for two weeks from the last known sales volume).

Sales Two Weeks After $_{OMO}$ = 0.757052 - 0.00079* 2,025 + 0.050016* 0 + 0.019688* 900 - 0.00138 * (0*900) + 0.13520* 33,816.88
= 0.757052 – 1.59975 + 17.7192 + 4,572.04
= 4,588.92

Example 2: The above example shows clearly that even if price is kept constant and media investments focus on television spending, the expected sold quantity continues to decline from one week to another due to the more powerful impact of a low carryover brand effect in sales. Assuming all

conditions remain unchanged and radio_Sqt becomes ZAR450 and ZAR900, the sold quantity for the first forecasted week is:

Sales Next Week $_{OMO}$ = 0.757052 - 0.00079* 2,025 + 0.050016* 450 + 0.019688* 900 - 0.00138 * (450*900) + 0.13520* 250,000
= 0.757052 – 1.59975 + 22.5072 + 17.7192 – 558.9 + 33,800
= 33,280.48

The smaller quantity sold compared to the situation when only television investments were made is generated by the negative interaction effect on volumes sold by combining radio and television spending within the same week.

A similar behavior of reduction when compared to Example 1 is applicable for the subsequent forecasted week, as well.

Sales Two Weeks After $_{OMO}$ = 0.757052 - 0.00079* 2,025 + 0.050016* 450 + 0.019688* 900 - 0.00138 * (450*900) + 0.13520* 33,280.48
= 0.757052 – 1.59975 + 22.5072 + 17.7192 – 558.9 + 4,499.52
= 3,980.00

Conclusion to Alternative Methods Proposed for Optimal Pricing Strategies

With the flaws of the practical application of models 14 and 15, the study provides two alternative workable solutions for optimising the IMC strategy for marketers who wish to optimise sales levels for their respective firms. Given the practical application limitation of models 14 and 15, this study offers one alternative method (model 18) and another alternative approach within the scope of this study (model 7) that both conclude theoretical and practical applications to marketing scenarios that can be utilised until such time that an alternative model is derived that proves to be both theoretically sound and, most importantly, practically applicable when testing optimal IMC strategies with real-time marketing scenarios.

6.1.4 Conclusion of Proposition 1

With the results emphasising the more significant influence of radio and television than the other media platforms consisting of internet, press and out-of-home advertising (table 12), it is concluded that emerging markets are characterised by varying media effectiveness for selected media platforms (with internet being the least significant) and the varying effectiveness must be considered when allocating budget and resources amongst media platforms within emerging markets, which the results of model (7) and its affiliated optimum media schedule does. With radio and television reaching over 90% of the population in South Africa, and internet penetration reaching only 30% (figure 1), the results that media platforms and their respective interaction effects with a wider reach have larger effects on sales is also conclusively supported by the research study's results.

Radio, television and their respective synergistic effects proved statistically significant in influencing sales in emerging markets. With the other media platforms furnishing insignificant results and having unequal effectiveness in their influence on sales, proposition 1 is concluded valid and acceptable within the context of this study. The insignificance of the remaining media platforms and their respective interactions could be attributable to economic and social constraints present in emerging markets, the overpowering and extremely dominating influence of brand, price and Radio and television in influencing sales as well as the inconsistent advertising spend across multiple media platforms. With this study consisting of null values for a considerably large portion of advertising spend across mediums as well as the study's focus on pairwise interaction effects, the remaining media platforms and their synergistic effects could be much greater than evidenced in this study.

Although it is apparent that brand managers are concerned with the optimal media mix of all five media platforms and the affiliated budgets thereof, given the insignificance of four of the five media platforms and interaction effects within the above analysis, the results present the conclusion that emerging markets are characterised by varying media effectiveness for selected media platforms (regardless of the significance resulting in this study). Inasmuch it is

believed that given an exhaustive dataset that has consistent advertising spend across all mentioned mediums, that the application of model (6) could be used to fit data, which will be able to provide more rigorous and dynamic results for marketers and future researchers on the topic of marketing media and synergistic effects in influencing sales in emerging markets. With this, researchers are urged to use a more exhaustive dataset to investigate the effects of such media platforms and their respective interactions as well as the synergistic effects between all five media platforms and not just pairwise interactions.

In conclusion the results reject model (1) derived by Naik and Raman (2003), which is based on developed market data, theory and practise. Inasmuch as the study furnishes strong support for the application and theoretical validity of model (7) in emerging markets, it indirectly confirms that developed market models cannot be transferred directly onto emerging markets and provides support for the various unsuccessful attempts that have been made in previous marketing practices and theories in trying to harness emerging markets (Rishi, 2012). This could partially be attributed to the fact that developed markets and global companies tend to transfer accumulated knowledge and practice of marketing from their home countries into emerging markets, neglecting the country's specifics and particular consumers' behaviours. The specifics regarding marketing media platform effectivity in emerging markets should be considered when discussing marketing as a theory and application in these markets. With emerging markets being recognised as increasing opportunities for investments and development, it is evidenced that much remains to be done in marketing research and the application thereof to achieve the desired level of developed economies.

6.2 Proposition 2: Consumer-Based Brand Equity is significant in influencing sales

6.2.1 Brand Significance

In contrast to the stereotypical beliefs that low-income consumers in emerging markets are driven primarily by price (Kandachar & Halme, 2008; Simanis et al. 2009), this study furnishes strong support for the notion that emerging market consumer purchase behaviour is driven primarily by consumer-based brand equity and their respective perceptions of brands within the market place. This finding validates proposition 2. With most global brands presuming that emerging market consumers are typically associated with extremely high price sensitivities (due to associated disposable income constraints), this study concludes that although price is a determining characteristic in influencing sales, the significant influence of consumer-based brand equity somewhat contradicts the traditionally assumed primary price influence that global brands assume when interpreting what drives emerging market consumers behaviour (table 12).

The studies concluded by Baraki and Parente (2010) and Rishi (2012) relating to emerging markets' (and predominantly low income consumers) purchase behaviour indeed had merit within the confining results of this study. These authors argued that due to lower disposable income constraints, aspirational, status-seeking attributes and the unaffordability of being able to make mistakes, lower income consumers purchase products/services that offer (and are associated with) the highest quality. The authors attributed this to consumers typically requiring a product/service that lasts longer due its credibility, has a quality status attached to the brand and/or correspondingly a product/service that is seen to increase their aspirational and social status amongst their peers (Pitta, Guesalaga & Marshall, 2008). Although the underlying characteristic(s) comprising consumer brand equity in emerging markets was beyond the scope of this study, the study confirms that brand perception is proven to be the most significant influence in promoting

purchase behaviour within emerging markets and this should not be taken for granted by marketers and future researchers.

6.2.2 Consumer-Based Brand Equity

Consumer-based brand equity is an important marketing topic and the results of this study confirm the significance of this intangible value that brands bring to a firm. The basic concept of brand equity is that differences in perceptions of brands arise from the 'added value' endowed to a product/service as a result of past investments in the marketing for the brand (Keller, 2009). It can be said that brand equity provides a common denominator for interpreting marketing strategies and assessing the value of a brand, which has many different ways of how its value can be manifested or exploited to benefit the firm. As evidenced by this study, with consumers predominantly making choices between different products and services, *brands* are concluded to matter extensively to firms should they wish to drive and promote sales within emerging markets. If firms wish to promote and generate additional sales within emerging markets, the brand's strength and affiliated brand equity becomes the vital and defining characteristic of the brand's (and the firm's) success.

The results showcase that a result of the strength and equity of a brand is that consumers may be more willing to attend to additional communications for a brand, process these communications more favourably, have a greater ability to later recall the communications or their accompanying cognitive or affective reactions and, in turn create consumer purchase behavior which is favourable to a firm's bottom line. The promotion of sales and, correspondingly, advertising communications benefits, only arise as a result of having a strong brand, as evidenced in the results of this study. This means firms and advertisers must expend an enormous amount of effort on the creation of a strong brand should they wish to increase and drive sales within emerging markets.

6.2.3 Building a Strong Brand

According to Keller (2009), to build a strong brand, the right knowledge structures must exist in the minds of actual or prospective consumers so that they respond positively to marketing activities in different ways and, marketing communications are seen to play a crucial role in shaping this knowledge. Brand knowledge is seemingly not only about the facts about the brand, it is also concerned with the thoughts, feelings, perceptions, images and experiences that become intrinsically connected to the brand in the minds of consumers. All of this information can be thought of in terms of a set of associations to the brand in consumer memory. Strong, favorable and unique brand associations are essential as points-of-difference that can serve as sources of brand equity to drive the differential effects. Although these effects typically include enhanced loyalty; price premiums; greater communication and channel effectiveness; and growth opportunities *via* extensions or licensing (Hoeffler & Keller 2003; Keller 2008) the notable effects of a strong, favourable and unique brand is that of increased sales in emerging markets.

6.2.3.1 The Role Of Marketing Communications in Driving Consumer Brand Equity

With consumer-based brand equity being defined as the differential effect of consumer knowledge of a brand on their response to marketing efforts for that brand, the notion of marketing media platforms and their respective influence comes into play. From a consumer-based brand equity perspective, marketing communications activities contribute to brand equity and drive sales in many ways (Keller 2009), namely by creating awareness of the brand, connecting the right associations to the brand image in consumers' memory, eliciting positive brand judgments or feelings, and/or facilitating a stronger consumer–brand connection.

In developing an integrated marketing communication (IMC) programme, many factors are considered. From the perspective of creating brand associations and building brand equity, marketers need to be 'media neutral' and evaluate all the different possible communication options according to the

effectiveness criteria (as outlined in the aforementioned section discussing media platform effectiveness) as well as efficiency considerations (these are discussed in the ensuing section of price sensitivities in emerging markets). Marketers need to 'mix and match' communication options to build brand equity; that is, to select a variety of different communication options that are most effective in emerging markets (table 12) that share common meaning and content but also offer different, complementary advantages so that the whole is greater than the sum of the parts (Naik & Raman 2003; Naik, Raman, & Winer 2005; Naik & Peters, 2009). Different brand associations may be most effectively established by capitalising on the marketing communication options outlined in this study which are proven to be more conducive in eliciting a particular consumer responses or establishing particular types of brand associations. For example, television and radio are demonstrably better at penetrating emerging market consumer mindsets than other marketing communication mediums. Inasmuch communication efforts should be directed through the best-suited, most effective marketing media platforms in order to promote strong, favourable and unique brand associations and, in turn, consumer-based brand equity. This consumer-based brand equity and perceptions of affiliated brands within the context of the South African market is the primary driving force behind the promotion of sales within emerging markets.

6.2.4 Conclusion of Proposition 2

The manner in which brand associations and, correspondingly brand equity are formed is beyond the scope of this study. However, the significance of the *brand* itself in promoting and influencing sales in emerging markets is of utmost importance. Brand equity is derived from past investments and, although a large number of the marketing media and their respective communication platforms are not statistically significant within the results of this study, brand equity is derived from such past investments in marketing activities with the focus of communication through these various media platforms. These investments would typically be targeted through advertising efforts such as advertising through the use of an emotional television

commercial, which creates brand associations in the minds of consumers and, in turn, builds brand equity.

As such, when considering the significance and strength of brand and brand perception in influencing sales within this study, it must be concluded that marketing communication activities must be integrated to deliver a consistent message and achieve the desired strategic positioning in order to promote brand equity and drive sales within emerging markets. Marketers need to assess the experiences and impressions that will have the most influence at each stage of the buying process in order to ensure that brand associations are created. This understanding will help advertisers allocate communication spend more efficiently and design and implement the right communication programmes. Armed with these insights, marketers can judge marketing communications according to the ability to affect experiences and impressions and build brand equity. Once brands have this right, the results of this study furnish strong support that firms will be able to optimise the level of sales within their organisations.

6.3 Proposition 3: Price is significant in influencing sales in emerging markets

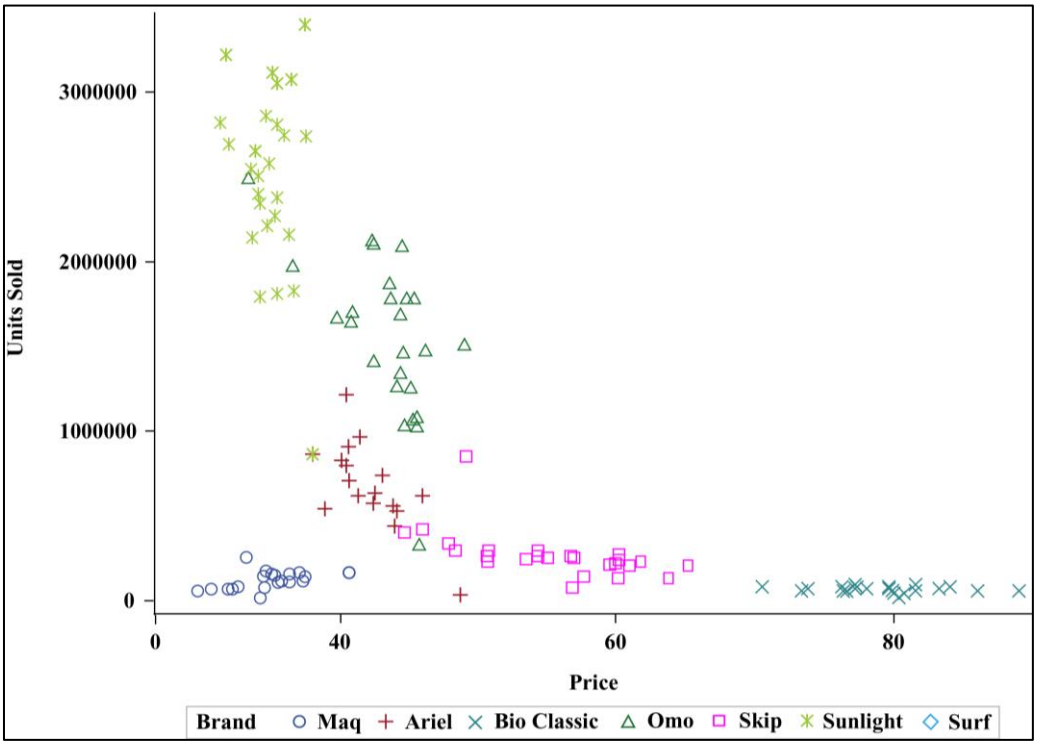
The results from figure 9 showcase that price exhibits a quadratic relation with units sold for the washing detergent category in South Africa. This reinforces the assumption made upfront about price and sales (which is reflected and accounted for in the final model (7)). It is evidenced that the South African washing detergent market is a price sensitive driven market and, with the results of the data (figure 9) the quadratic relation of price with units sold concludes that typically, the higher the price, the less units sold and *vice versa*. With the literature providing insight into the price sensitivities within this consumer base, it is believed that price within emerging markets is significant in influencing sales for three defining reasons. Firstly, the number of products purchased (quantity purchased); secondly, the level of income for each respective consumer (disposable income constraints) and, thirdly, the quality

of a brand (brand perception and affiliated equity). The following three sections investigate these in more detail.

6.3.1 Price Sensitivity due to Quantity

Consumers are perceived to be price sensitive when consuming products in larger batches. Figure 9 supports the notion that high price sensitivity exists when large volumes are bought. Correspondingly, for small quantities purchased, the behaviour of consumers is that price is not viewed as a constraint in influencing their purchase decision (this is discussed further with brand quality and perceptions). However, it is apparent that as a rule in the presence of mid-to-low prices, higher quantities appear to continue to grow along with the decline in prices reflecting the price sensitivity of the consumers who would, typically be looking for value for their money**.**

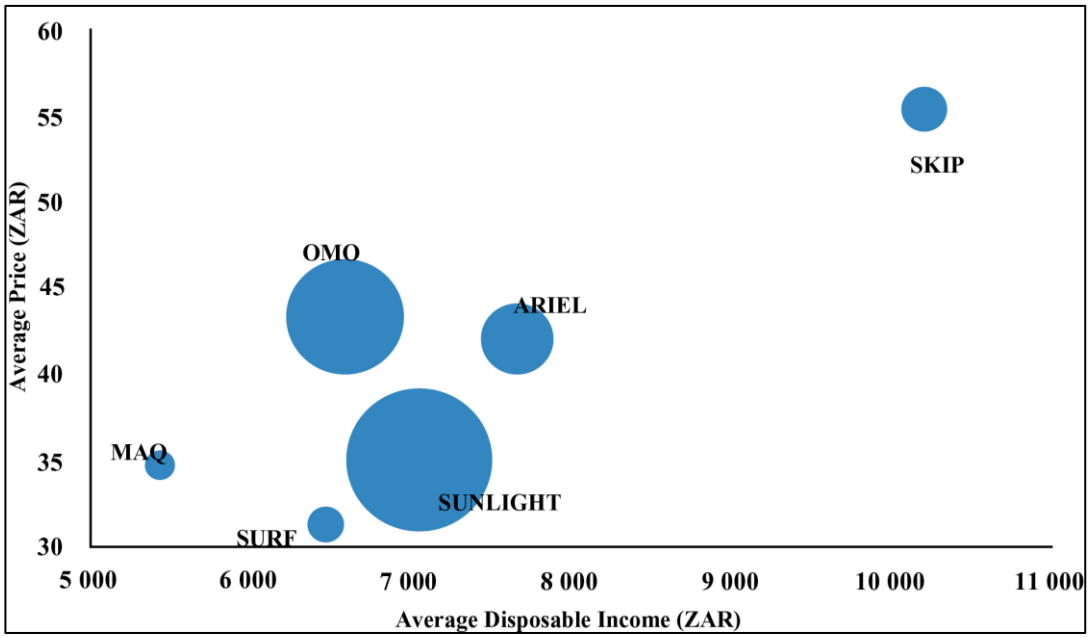
Figure 10: Scatter Plot of Units Sold versus Price (Quadratic relationship)



6.3.2 Price Sensitivity Due to Low Disposable Income

Figure 10 depicts the average disposable income, price and quantity per brand. The size of the bubble denotes the average quantity sold (units). The Average Personal Disposable Income was calculated using the numerical values available for each category (internet, out-of-home, press, radio, v). The average for Maq and Omo was calculated based on Internet and out-of-home values; Ariel's average was based on internet, out-of-home and radio; Skip and Sunlight averages were based on internet, out-of-home and press; Surf was based on internet, out-of-home, press and television. The figure provides strong evidence that price sensitivity is due to the constraints of emerging market consumers' disposable income which, evidently affects their purchase behaviour.

Figure 11: Average Disposable Income (AMPS), Price and Quantity per Brand



Specifically focussing on Sunlight, Maq and Surf, these brands are perceived to be relatively mid-to-low ranged quality washing detergents, but are known for their cheaper prices. Given the lower disposable income level (Consumers earning less than R8000/month), it is evident that the higher quantities

purchased (reflected by the higher units sold and larger bubble) reflect consumers' respective limited monetary constraints, which supports the notion that lower income consumers in emerging markets are typically price sensitive due to their disposable income constraints. With South Africa's population constituting of over 70% of consumers earning less than R5800/month, studies conducted by Barki and Parente (2010) and Sheth (2011) postulated that the most prominent characteristic restraining lower income consumers is that they are constrained by limited resources from a monetary perspective, this is considered extremely plausible. Reaffirming that emerging market consumers (typically the lower income consumers) tend to spend their little money very wisely by ensuring there is no wastage as every cent counts and, these consumers focus more on essentials, and this behaviour includes instances where consumers favour the lowest price items that offers acceptable quality, even in the case of luxuries.

The study furnishes support for the literature reviewed in chapter 2 that stated that emerging markets (specifically low-income consumers) are often characterised by immediate disposable income constraints and, exhibit consistent monthly trends of limited disposable income. Inasmuch as the current research study confirms Rishi's (2012) appeal to marketing managers to rather advertise and market initiatives that promote and respond to appeals that promise short-term benefits, it is because the immediate gratification and benefit is evidently what drives and promotes immediate sales within this consumer base. Should a brand be targeting a higher income group (which would typically be less than 30% of South Africa's population) evidently their constraints are not concerned with limited monetary resources and, as such price sensitivity is evidenced by the higher end of South Africa's income group (earning over R8000) purchasing a brand that is respected to be the highest quality in the market and, correspondingly, at the highest possible price.

6.3.3 Price Sensitivity Due to Quality & Brand Perception

With the results of this study proving that brand perception is the most significant influencer on sales, it is not surprising that emerging market

consumers are price sensitive when it comes to purchasing products/services. There are two possibilities regarding the price sensitivities of emerging markets with regard to purchasing high quality brands. These are discussed in the below section.

6.3.3.1 Low Income Disposal

With the results outlining the limited monetary constraints that lower income consumers typically face, the literature outlined in chapter 2 by Baraki andParente (2010) and Rishi (2011) stated that, due to the lower disposable income constraints and, unaffordability of being able to make mistakes, lower income consumers tend to purchase products/services that offer and are associated with the highest quality, in the hope that the product/service lasts longer due its credibility and affiliated guarantee in the market place. These consumers also want the best for themselves and for their children and aspire to have the highest quality of products that they can afford because they know they will get more value out of the product in the long-term. These higher quality products are most often affiliated with higher prices. This is evident with both the Ariel and Omo washing detergent brands. Ariel and Omo are considered mid-to-high-end detergents in the South African marketplace and are priced as such. As evidenced by the large units sold for Omo and Arial (the higher priced, quality product) consumers exhibiting low disposable income (less than R8000/month) are seen to purchase the product specifically for the quality and the affiliated brand perception of the product (that it will work better and last longer).

6.3.3.2 Status & Aspirations

Supporting the literature discussed in chapter 2 by Pitta, Guesalaga and Marshall (2008), the actions of lower income consumers purchasing higher priced, quality products reflects consumers' increasing aspirational status amongst their peers which is proven in this study's results to be a significant influence in promoting purchase behaviour amongst emerging markets. Purchasing higher priced, quality products indirectly exposes lower income consumers to an increased social status amongst their peers and, as such the

example for Arial and Omo used in the above paragraph are also be seen as defining reasons for the purchase of such higher priced and quality products for this typical consumer in emerging markets.

6.3.4 Optimal Pricing Strategies

Although a theoretically sound optimal pricing strategy was derived (model 10 below for ease of reference) in the aforementioned results section, when the washing detergent category data was tested using this model, confounding results were obtained.

$$p_i^* = \frac{-S_{t-1}}{2\mu_i^*\theta} = \frac{-S_{t-1}}{2\theta}\frac{1}{\pm\sqrt{\frac{-S_{t-1}}{\theta(\rho-\lambda_i+1)}}} = \frac{\pm S_{t-1}}{2\theta}\sqrt{\frac{\theta(\rho-\lambda_i+1)}{-S_{t-1}}} \qquad (10)$$

Table 19: Model (10) Optimal Pricing Strategy Results from Washing Detergent Brand (Omo) (South African Rands (ZAR))

Brand	Price
Maq	R146.77
Omo	R525.68
Skip	R124.67
Sunlight	R488.26
Surf	R100.46

Given the theoretical soundness and validity of model (10) when determining optimal pricing strategy, the practical application is considered flawed. With these results, it can be concluded that the flaws attributed to the regression model di not accurately reflect the nature and impact of pricing and advertising and it is proposed that other non-regression techniques are employed, such as sampling from the data to find best results.

With the flawed nature of the theoretical models in their practical application to real life marketing situations, the study focused on other methods that could be used to determine the optimal media schedules and budgeting allocation thereof. The methods and suggestions are discussed below.

6.3.4.1 Alternative Methods for Optimal Pricing Strategy

Alternative Application 1

The (theoretically sound) optimal pricing strategy exhibits similar practical application limitations as outlined in the discussion section around optimal budgetary strategies and marketing media schedules. In this discussion section, an alternative method was presented that made use of the Bayesian type approach. The results thereafter presented the reader with an alternative estimation approach that could be used to estimate each brand's respective optimal price and media spend schedule. As such, it is advised that should the reader wish to revisit the alternative method proposed for optimal pricing, that they refer to the section on 'alternative marketing method for IMC strategy optimisation' under the discussion of proposition 1.

Alternative Application 2

From the results of the significant variables influencing sales in emerging markets (table 12) and their respective brand models (which identifies the coefficients of the significant variables) derived thereafter (Essentially model (7) applied to each respective brand) marketers are able to connect the proposed values they have for their respective pricing and media strategy and, correspondingly be able to determine the level of sales their firm should derive based on the proposed marketing media spend and pricing strategy. An application of model (7) with the washing detergent category is given below:

***Example 1*:** While restating the conditions defined at *Example 1* - OMO Brand with Sales Last Week at 250,000 units and ZAR900 TV_Sqt spending -, in case of a price increase from ZAR45 to ZAR55 per unit (Price_Sq = 3,025), the equation becomes:

Sales Next Week $_{OMO}$ = 0.757052 - 0.00079* 3,025 + 0.050016* 0 + 0.019688* 900 - 0.00138 * (0*900) + 0.13520* 250,000

= 0.757052 – 2.38975 + 17.7192 + 33,800

= 33,816.89

The negative effect on sold quantity is minimal with the change is found only within the decimals, demonstrating that the impact of price increases is almost insignificant. In the case of the following week, the result also remains practically unchanged (4,588.13 versus 4,588.92):

Sales Two Weeks After $_{OMO}$ = 0.757052 - 0.00079* 3,025 + 0.050016* 0 + 0.019688* 900 - 0.00138 * (0*900) + 0.13520* 33,816.89
= 0.757052 – 2.38975 + 17.7192 + 4,572.04
= 4,588.13

Conclusion to Alternative Methods Proposed for Optimal Pricing Strategies

With the flaws of the practical application of model (9) outlined above, the study still has two workable models to establish optimal sales levels for a firm. Model 6 calculates sales given the firm's proposed prices and media schedule spend across two media platforms and model 18 is able to optimally calculate prices and the effects of changes in prices on units sold.

6.3.5 Conclusion to Proposition 3

The results indicate that price has a significant influence on sales within emerging markets (table 12). This study, as well as supporting literature in chapter 2, confirms and validates proposition 3 that price has a significant influence on sales in emerging markets. The literature reviewed in chapter 2 also supports the notion that price sensitivities are influenced by one of three determining factors, being either the quantity purchased, or the disposable income constraints or the brand perception and quality.

The significance of price within the context of the South African washing detergent market is extensively evidenced within this study. Inasmuch, the results of this study furnishes strong support for the literature reviewed, concluding that emerging markets are price sensitive and, resultantly furnishes support for model (7) that accounts for the relative price sensitivities within emerging markets.

The study derived a theoretically sound optimal pricing strategy which considered the price sensitivities within emerging markets that is postulated to be due to one of the following determinants, namely the quantity purchased, the disposable income constraints and/or brand perception and affiliated quality. However, given the flawed practical application of the derived optimal pricing model (10) when applied to the data, the study proposes further research and investigation into the formulation of a more practically applicable optimal pricing strategy. Given the practical application limitation of model (10), this study offers one alternative method (18) and another alternative approach within the scope of this study (model 7) that both conclude theoretical and practical applications to marketing scenarios, which can be used until such time as an alternative model development is derived that proves to be both theoretically sound and, most importantly, practically applicable when testing optimal pricing strategies with real-time marketing scenarios.

6.4 Research Proposition 4: Models that are derived in developed markets differ from models developed in emerging markets when attempting to optimise sales

6.4.1 Model (1): Developed Market Model

Model (1) derived by Naik and Raman (2003), concluded its theoretical validity to emerging markets in that it included two marketing media platforms and their respective synergistic effects. However, due to consumer-based brand equity and price proving to be extremely significant variables influencing sales (table 12) in emerging markets, this developed market model is not applicable in its relevance within emerging markets. Correspondingly, with the practical application of Naik and Raman's (2003) derived optimal media and budgetary formula's to the study's washing detergent category data, the confounding results (table 16) further inferred that when applying developed market models to real emerging market scenarios the notion that

developed market models differ substantially in their effective and successful application was effectually, reaffirmed. As such, this notion supports the literature reviewed in chapter 2, stating that developed market models cannot purely be replicated within emerging markets as emerging markets are proven to have statistically significant and differing characteristics that influence sales (namely consumer-brand equity and price).

With the study's final model (6) differing from that of Naik and Raman (2003)'s model (1), no comparison could be performed in order to determine model (6)'s superiority. Future researchers are urged to explore this area in more detail. To conclude, the literature reviewed proposed a further extension of model 1 that being model (6), which incorporates 'perceived' influential variables that affect sales within emerging markets. The discussion concerning the results of model (6) follows.

6.4.2 Model (6): Proposed Emerging Market Model

Based on the results presented in this study there is strong evidence that consumer-based brand equity, price, radio, television and their respective interaction effects, affect sales in emerging markets (table 12). With the enormity of the impact of non-exhaustive media spend (zero-inflated data), the significance and validity of model (6) was not evidenced in the final analysis. However, the results of the significant variables influencing sales within emerging markets concluded that, although model (6) was not seen to be supported by the data, models derived with their application to developed markets cannot directly be transferred into emerging markets and be expected to have the same anticipated results experienced in developed markets. In conclusion, the final model (7) differs from the proposed model (6) as only two of the five media variables (radio and television) and their respective interaction effects were proved statistically significant in influencing sales. Model (7) was applied throughout the remainder of this study and the results are discussed in the following section.

6.4.3 Marketing Model Implications for Emerging Markets

This study proposes model (7) as the most appropriate and representative model for advertisers wanting to establish ways to maximise their firms' sales given various advertising efforts. From the five media platforms under review, namely television, press, out-of-home, radio and internet, only two of these platforms were found to be significant, along with their multi-effect variable. Brand equity and price were also significant variables and were kept in the model. Although model (1) and (2) have their relevancy within emerging markets in the sense that (1) and (2) account for marketing media platforms and their respective synergistic effects whilst (2) also considers the notion of brands competing in an oligopolistic environment, two fundamental characteristics that are significantly influential in promoting sales within emerging markets are not considered namely, price and consumer-based brand equity.

The disparity between developed marketing theories (model 1) regarding optimal media schedules and these schedules' applicability within emerging markets motivates the relevancy and adoption of model (7). Model (7) explicitly incorporates the use of effective communication and marketing mediums (television and radio and their synergistic effects) as well as social and economic constraints (Consumer-based brand equity and price) inherent within emerging markets. Given model (7)'s inclusion and accountability of the inherent characteristics present within emerging markets, the model is able to provide more insightful and applicable solutions that advertisers are able to adopt when considering how best to maximize sales within their firms in emerging markets. The derivations of model (7) offer further marketing insight to advertisers wishing to optimize sales within emerging markets in that it provides a theoretically sound optimal pricing and budgetary strategy that is able to guide advertisers on how best to allocate budgetary resources across effective media platforms that are proven influential in driving and promoting consumer purchase behaviour.

With the significant statistical evidence supporting model (7) and its respective influential variables outlined above, it can be concluded within this study that developed market models and the application of affiliated theory and practice are not necessarily intuitive or reflective of the consumer behavior landscape in emerging markets. Consumer behaviour differs significantly in emerging markets when compared to developed markets and the notion that marketing conventions are taken for granted in developed economies (internet, computers, smartphones), in terms of their significance and effectiveness are clearly evident in the results of this study. This is supported by the significance of television and radio as the highest rated influential marketing conventions within emerging markets in terms of their perceived influence, effectiveness and reach.

This study promotes the notion that promoting sales *via* the use of various communication mediums within emerging markets requires an overhaul due to the possible availability of media infrastructure and affordability of both the media vehicle (television receiver) and the medium itself (magazine). Similarly the results indicate that social and economic factors (aspirational status, low-disposable income constraints, availability, accessibility) impact and impinge on the communication strategies that target emerging market consumers and firmly suggests that these factors and constraints need to be deemed crucial issues when global (or local) firms consider implementing marketing strategies within emerging markets. The significance of television and radio, their respective synergistic effects, price and consumer brand equity substantiate the notion that emerging markets differ substantially from developed markets and, as such traditional marketing strategies, theories and practices that have been developed and have proven effective in developed economies (model 1 and 2) do not accurately reflect the emerging market's consumer landscape and thus, cannot be directly transferred into emerging markets with the expectation of similar results.

In conclusion, unlike the stereotypical belief that developing economies would follow growth footprints of emerged economies, this study furnishes support that there are glaring differences between emerging and developed markets

with consumer purchase behaviour being driven and influenced by differing characteristics and marketing and communication strategies. This study provided theoretical models and insights that will guide advertisers more accurately in terms of the development of more effective marketing and communication strategies. As such, enabling firms to harness the most effective variables, which are seen to affect advertising efforts and, promote consumer purchase behaviour within emerging markets.

6.4.4 Further Marketing Applications

An advertiser's decision-making problem is to determine the total budget and its allocation to various marketing mediums (Naik and Raman (2003), Naik, Raman and Winer (2005). It is apparent that the empirical results of model (7) showcased significance of only two media platforms and their respective interaction effects with one another, consumer-based brand equity and price and, as such the optimal IMC strategies derived in the results section (Optimal IMC Strategies) were based on these results. The insignificance of the three remaining media platforms (internet, press and out-of-home) could be attributable to the overpowering and extremely dominating influence of brand, price, television, Radio and their respective interaction effect in influencing sales, as well as the inconsistent advertising spend across multiple media platforms that was exhibited in the data limitation throughout the analysis. However, given the data limitations of this study, the researcher believed that a more exhaustive dataset for advertising spend across all mentioned mediums could produce the application of model (6) that could be used to fit significant data, which would prove more rigorous and dynamic results for marketers and future researchers on the topic of marketing media and synergistic effects in the influence on sales within emerging markets. With this, the decision to establish the optimal media schedule for all five respective media platforms was taken and is outlined in the below section.

6.4.4.1 Model (6) Optimal Pricing and IMC Strategies

Although model 10 (optimal pricing strategy), model 14 (optimal budgeting solution) and model 15 (optimal media mix strategy) presented in the results

section provide the most appropriate theoretical models (not necessarily practically applicable) for IMC strategy formulation within the South African marketplace, future researchers and advertisers (who have access to a more exhaustive database) will be interested in the optimal IMC strategy derivation of model (6), which incorporates brand equity, price and all media platforms with their corresponding synergistic effects. Hence, for guidance to future researchers investigating optimal media schedules in emerging markets the optimal price and IMC strategy affiliated with model (6) for each respective media platform was derived.

As discussed in the aforementioned section outlining the assumptions of model (6), the same assumptions are applicable for model (6) and the following is specifically noted before deriving the optimal pricing and IMC strategy:

- α_i is the brand effect/influence that varies across brands but is constant over time. Due to α_i being constant over time, the inclusion of α_i proves to be futile and inconsequential in its significance in the derivation of the optimal pricing and IMC strategy and, as such, is removed when the strategy formulations are derived.
- ϑ_{it} is a normally distributed composite error term that consists of two components (the brand specific error component σ_i^2, and the error component σ_e^2), where $\alpha_i = \alpha_i + \epsilon_i \text{ and } \epsilon_i \sim N(0, \sigma_i^2)$; and $\vartheta_{it} \sim N(0, \sigma_e^2)$; and, $\epsilon_i \text{ and } \vartheta_{it} \text{ are independent}$. As such, similar to the notation above on the variable α_i, the inclusion of ϑ_{it} proves to be futile and inconsequential in its significance with the derivation of the optimal pricing and IMC strategy and, as such, is removed when the strategy formulations are derived.

For sake of easier reference, model (6) is presented below where it considers price, P, lagged/auto-regressed Sales variables, $S_{i,t-1}$, and media spend in each of 5 categories, x_k. $u_k = \sqrt{x_k}$.

$$S = \theta * P^2 + \sum_{k=1}^{5} \beta_k u_k + \sum_{\substack{k,j=1 \\ k<j}}^{5} \kappa_{kj} u_k u_j + \lambda_i S_{i,t-1} \qquad (6)$$

Based on model (6)'s regression model the rate of change of sales from one period to the next can be constructed to be:

$$\frac{\partial S}{\partial t} = \lim_{\Delta t \to 0} \frac{\Delta S_t}{\Delta t} = \theta * P^2 + \sum_{k=1}^{5} \beta_k u_k + \sum_{\substack{k,j=1 \\ k<j}}^{5} \kappa_{k,j} u_k u_j + \lambda_i S_{i,t-1} - S_{t-1}$$

This equation states that to find the change in sales the current period sales must subtract the sales from the previous period (the subtraction is the last term, S_{t-1}). The first part of the regression equation predicts the sales for the new period.

Next, the Hamiltonian is defined to be:

$$H(P, u_k, u_k, u_k, u_k, \mu, S) = P * S_{t-1} - \sum_{k=1}^{5} u_k^2 + \mu\left(\theta * P^2 + \sum_{k=1}^{5} \beta_k u_k + \sum_{\substack{k,j=1 \\ k<j}}^{5} \kappa_{k,j} u_k u_j + \lambda_i S_{i,t-1} - S_{t-1}\right) \qquad (19)$$

The Hamiltonian must be optimised to find the ideal selling price and optimal media spends that maximise profit for this regression model.

Model (6) Optimal Price Strategy

Due to the variables influencing the optimal pricing strategy derived for model (7) remaining unchanged, the optimal pricing strategy for model (6) is, in turn, considered as follows.

The Hamiltonian is optimised to find the ideal selling price that maximises profit for this regression model.

$$\frac{\partial H}{\partial P} = S_{t-1} + 2\mu\theta P = 0$$

$$P = \frac{-S_{t-1}}{2\mu\theta} \qquad (20)$$

Next,

$$\frac{\partial \mu}{\partial t} = \rho\mu_i - \frac{\partial H}{\partial S}$$

At equilibrium, $\frac{\partial \mu}{\partial t} = 0$ should be had, as well as (19),

$$\frac{\partial H}{\partial S} = P' * S + P * 1 + \mu(\lambda_i - 1)$$

And from (20),

$$P' = \frac{-1}{2\mu\theta}$$

Hence,

$$\frac{\partial H}{\partial S} = \frac{-1}{2\mu\theta} * S_{t-1} + P * 1 + \lambda_i - 1$$

Then,

$$\frac{\partial \mu}{\partial t} = \rho\mu_i - \left(\frac{-1}{2\mu_i\theta} * S_{t-1} + P * 1 + \mu(\lambda_i - 1)\right)$$

Substitute in (20),

$$= \rho\mu_i - \left(\frac{-1}{2\mu_i\theta} * S_{t-1} + \frac{-S_{t-1}}{2\mu\theta} * 1 + \mu(\lambda_i - 1)\right) = 0$$

After some algebra,

$$\mu_i^2(\rho - \lambda_i + 1) + \frac{S_{t-1}}{\theta} = 0$$

The quadratic formula is applied to get,

$$\mu_i^* = \pm\sqrt{\frac{-S_{t-1}}{\theta(\rho - \lambda_i + 1)}}$$

Finally, it is substituted back into (20) and retrieves,

$$p_i^* = \frac{-S_{t-1}}{2\mu_i^*\theta} = \frac{-S_{t-1}}{2\theta}\frac{1}{\pm\sqrt{\frac{-S_{t-1}}{\theta(\rho-\lambda_i+1)}}} = \frac{\pm S_{t-1}}{2\theta}\sqrt{\frac{\theta(\rho-\lambda_i+1)}{-S_{t-1}}} \qquad (21)$$

Notice that there are two solutions and the one that gives the positive price should be selected, which will most likely be the positive version. If both versions are positive it may indicate that there are two different optimal prices (perhaps a strategy that goes after price sensitive consumers and attempts to sell on volume whereas another strategy could be targeting consumers who want a high quality product and are willing to pay for it).

Thus there is an optimal price for each of the *ith* brands based on the regression parameters, the discount rate ρ and the previous period's sales, S_{t-1}.

Model (6) Optimal IMC Strategy

Following the same process outlined in the optimal IMC strategy formulation for model (7), next, the Hamiltonian is optimised to find the optimal media spends for model (6) and this, is considered as follows:

$$\frac{\partial H}{\partial u_1} = 0 = -2u_1 + \mu_i^*(\beta_1 + \kappa_{1,2}u_2 + \kappa_{1,3}u_3 + \kappa_{1,4}u_4 + \kappa_{1,5}u_5)$$
$$\frac{\partial H}{\partial u_2} = 0 = -2u_2 + \mu_i^*(\beta_2 + \kappa_{1,2}u_1 + \kappa_{2,3}u_3 + \kappa_{2,4}u_4 + \kappa_{2,5}u_5)$$
$$\frac{\partial H}{\partial u_3} = 0 = -2u_3 + \mu_i^*(\beta_3 + \kappa_{1,3}u_1 + \kappa_{2,3}u_2 + \kappa_{2,4}u_4 + \kappa_{2,5}u_5)$$
$$\frac{\partial H}{\partial u_4} = 0 = -2u_4 + \mu_i^*(\beta_4 + \kappa_{1,4}u_1 + \kappa_{2,4}u_2 + \kappa_{3,4}u_3 + \kappa_{4,5}u_5)$$
$$\frac{\partial H}{\partial u_5} = 0 = -2u_5 + \mu_i^*(\beta_5 + \kappa_{1,5}u_1 + \kappa_{2,5}u_2 + \kappa_{3,5}u_3 + \kappa_{4,5}u_4)$$

Next, these solutions are converted to matrix form to solve this system of linear equations:

$$A\vec{u} = \vec{b}$$

Where:

$$\text{A=} \begin{bmatrix} -2 & a_{1,2} & a_{1,3} & a_{1,4} & a_{1,5} \\ a_{1,2} & -2 & a_{2,3} & a_{2,4} & a_{2,5} \\ a_{1,3} & a_{2,3} & -2 & a_{3,4} & a_{3,5} \\ a_{1,4} & a_{2,4} & a_{3,4} & -2 & a_{4,5} \\ a_{1,5} & a_{2,5} & a_{3,5} & a_{4,5} & -2 \end{bmatrix} \vec{u} = \begin{bmatrix} u_1 \\ u_2 \\ u_3 \\ u_4 \\ u_5 \end{bmatrix} and\ \vec{b} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \\ b_5 \end{bmatrix} \qquad (22)$$

$$a_{k,j} = \mu_i^* \kappa_{k,j} \text{ and } b_k = -\mu_i^* \beta_k \text{ for } k, j = 1, \cdots, 5 \text{ and } k < j$$

Applying Cramer's Rule to (22), it follows that the optimal solutions for each media spend are given below. Cramer's Rule is used to solve a system of linear equations. In the context of media advertising the variables of interest are total expenditure for each media. Hence Cramer's Rule can be used to determine total expenditure of each media of interest given the parameters. Cramer's Rule to (22) can be used to solve the following system of equations to find the square root of the optimal spend for each media category.

The det(A) was calculated using a mathematical software, wolframalpha using the following input: det{{-2, a_1, a_2, a_3,a_4}, {a_1,-2, a_5,a_6,a_7}, { a_2, a_5,-2,a_8,a_9},{a_3, a_6,a_8,-2,a_10},{a_4,a_7,a_9,a_10,-2}}.

The solution is provided in determinant form for simplicity.

$$u_1^* = \frac{\det(A_1)}{\det(A)} = \frac{det \begin{bmatrix} b_1 & a_{1,2} & a_{1,3} & a_{1,4} & a_{1,5} \\ b_2 & -2 & a_{2,3} & a_{2,4} & a_{2,5} \\ b_3 & a_{2,3} & -2 & a_{3,4} & a_{3,5} \\ b_4 & a_{2,4} & a_{3,4} & -2 & a_{4,5} \\ b_5 & a_{2,5} & a_{3,5} & a_{4,5} & -2 \end{bmatrix}}{det \begin{bmatrix} -2 & a_{1,2} & a_{1,3} & a_{1,4} & a_{1,5} \\ a_{1,2} & -2 & a_{2,3} & a_{2,4} & a_{2,5} \\ a_{1,3} & a_{2,3} & -2 & a_{3,4} & a_{3,5} \\ a_{1,4} & a_{2,4} & a_{3,4} & -2 & a_{4,5} \\ a_{1,5} & a_{2,5} & a_{3,5} & a_{4,5} & -2 \end{bmatrix}} \qquad (23)$$

$$u_2^* = \frac{\det(A_2)}{\det(A)} = \frac{det\begin{bmatrix} -2 & b_1 & a_{1,3} & a_{1,4} & a_{1,5} \\ a_{1,2} & b_2 & a_{2,3} & a_{2,4} & a_{2,5} \\ a_{1,3} & b_3 & -2 & a_{3,4} & a_{3,5} \\ a_{1,4} & b_4 & a_{3,4} & -2 & a_{4,5} \\ a_{1,5} & b_5 & a_{3,5} & a_{4,5} & -2 \end{bmatrix}}{det\begin{bmatrix} -2 & a_{1,2} & a_{1,3} & a_{1,4} & a_{1,5} \\ a_{1,2} & -2 & a_{2,3} & a_{2,4} & a_{2,5} \\ a_{1,3} & a_{2,3} & -2 & a_{3,4} & a_{3,5} \\ a_{1,4} & a_{2,4} & a_{3,4} & -2 & a_{4,5} \\ a_{1,5} & a_{2,5} & a_{3,5} & a_{4,5} & -2 \end{bmatrix}} \quad (24)$$

$$u_3^* = \frac{\det(A_3)}{\det(A)} = \frac{det\begin{bmatrix} -2 & a_{1,2} & b_1 & a_{1,4} & a_{1,5} \\ a_{1,2} & -2 & b_2 & a_{2,4} & a_{2,5} \\ a_{1,3} & a_{2,3} & b_3 & a_{3,4} & a_{3,5} \\ a_{1,4} & a_{2,4} & b_4 & -2 & a_{4,5} \\ a_{1,5} & a_{2,5} & b_5 & a_{4,5} & -2 \end{bmatrix}}{det\begin{bmatrix} -2 & a_{1,2} & a_{1,3} & a_{1,4} & a_{1,5} \\ a_{1,2} & -2 & a_{2,3} & a_{2,4} & a_{2,5} \\ a_{1,3} & a_{2,3} & -2 & a_{3,4} & a_{3,5} \\ a_{1,4} & a_{2,4} & a_{3,4} & -2 & a_{4,5} \\ a_{1,5} & a_{2,5} & a_{3,5} & a_{4,5} & -2 \end{bmatrix}} \quad (25)$$

$$u_4^* = \frac{\det(A_4)}{\det(A)} = \frac{det\begin{bmatrix} -2 & a_{1,2} & a_{1,3} & b_1 & a_{1,5} \\ a_{1,2} & -2 & a_{2,3} & b_2 & a_{2,5} \\ a_{1,3} & a_{2,3} & -2 & b_3 & a_{3,5} \\ a_{1,4} & a_{2,4} & a_{3,4} & b_4 & a_{4,5} \\ a_{1,5} & a_{2,5} & a_{3,5} & b_5 & -2 \end{bmatrix}}{det\begin{bmatrix} -2 & a_{1,2} & a_{1,3} & a_{1,4} & a_{1,5} \\ a_{1,2} & -2 & a_{2,3} & a_{2,4} & a_{2,5} \\ a_{1,3} & a_{2,3} & -2 & a_{3,4} & a_{3,5} \\ a_{1,4} & a_{2,4} & a_{3,4} & -2 & a_{4,5} \\ a_{1,5} & a_{2,5} & a_{3,5} & a_{4,5} & -2 \end{bmatrix}} \quad (26)$$

$$u_5^* = \frac{\det(A_5)}{\det(A)} = \frac{det\begin{bmatrix} -2 & a_{1,2} & a_{1,3} & a_{1,4} & b_1 \\ a_{1,2} & -2 & a_{2,3} & a_{2,4} & b_2 \\ a_{1,3} & a_{2,3} & -2 & a_{3,4} & b_3 \\ a_{1,4} & a_{2,4} & a_{3,4} & -2 & b_4 \\ a_{1,5} & a_{2,5} & a_{3,5} & a_{4,5} & b_5 \end{bmatrix}}{det\begin{bmatrix} -2 & a_{1,2} & a_{1,3} & a_{1,4} & a_{1,5} \\ a_{1,2} & -2 & a_{2,3} & a_{2,4} & a_{2,5} \\ a_{1,3} & a_{2,3} & -2 & a_{3,4} & a_{3,5} \\ a_{1,4} & a_{2,4} & a_{3,4} & -2 & a_{4,5} \\ a_{1,5} & a_{2,5} & a_{3,5} & a_{4,5} & -2 \end{bmatrix}} \quad (27)$$

Finally, the total budget, B and the proportion/mix of the budget can be obtained that should be spend on each category, Λ_k for the optimal IMC strategy.

To obtain the total optimal budget (B) the system of equations (23, 24, 25, 26 and 27) can be combined to obtain:

$$B = \sum_k^5 (u_k^*)^2 = \sum_k^5 x_k^* \qquad (28)$$

Similarly, to obtain the optimal IMC strategy and optimal media mix, Λ as:

$$\Lambda_k = \frac{(u_k^*)^2}{\sum_k^5 (u_k^*)^2} = \frac{x_k^*}{\sum_k^5 x_k^*} \qquad (29)$$

In practice, advertisers should estimate the model parameters for their specific brand in a given market by applying a suitable estimation approach which, based on Naik and Raman's (2003) research, the use of Kalman Filter Estimation is supported, thereafter determining the optimal budget and media mix equations from (28) and (29) respectively.

6.4.5 Conclusion

With the enormity and impact of the inconsistent media spend (zero-inflated data), only two media platforms and their respective interaction effect with one another was concluded as significant in influencing sales and, as such model (6) cannot be retained given the study's current dataset. With this, the final model derivation (7) is the most parsimonious of the theoretical models with it being able to optimise the level of sales for a firm given respective consumer-based brand equity, pricing, two media platforms and their respective synergistic effects between each other. Model (7)'s theoretical extension provided marketers with an optimal pricing and IMC strategy that can be further researched to determine a more practically applicable optimal solution that will maximise sales going forward.

Although further theoretical derivations were concluded on optimal IMC strategy solutions for model (6) with regard to optimum media schedules and budgets, the theoretical findings from the fitting of model (7) are concluded to be the most appropriate given the data and corresponding statistical analysis results. With the practical application limitations obtained from model (7)'s

IMC strategy derivations, similar limitations would need to be considered a viable constraint with model (6) when researchers attempt to derive its affiliated optimal IMC and pricing strategies. As such, this study urges marketers and researchers to obtain a more exhaustive dataset in order to test the application of each respective model as well as spend considerable effort and time focusing on deriving a model that is both theoretically sound and practically applicable for marketing as a discipline going forward.

Regardless of the possible practical IMC strategy application constraints outlined above, the results of this study provides enormous insights to Marketing as a discipline as it furnishes strong results that support the notion that marketing models, communication strategies, theory and the application thereof, derived and conceptualised in developed markets, is not necessarily applicable, reflective of, or relevant to emerging markets. The results indicated that social and economic factors (aspirational status, low-disposable income constraints, availability and accessibility) impact and impinge on the success of communication strategies that target emerging market consumers. Marketing models derived in developed markets do not necessarily consider the suggested constraints and underlying characteristics discussed in this study and, as such, could be deemed as the result of many global marketing strategies failing when attempting to harness emerging market opportunities.

In conclusion, the disparity between the variables influencing and being considered in developed market theories and, models (Notably model 1) regarding optimal media schedules and their schedules' applicability within emerging markets supports the adoption of model (7). As such it can be confirmed that there are glaringly different consumer behavioral patterns that are exhibited between emerging and developed markets (Rishi, 2012; Sheth, 2011). As such, these characteristics need to be considered when global firms consider utilising existing marketing strategies that are proven successful within developed economies when attempting to position and promote their brand within emerging markets.

CHAPTER 7: CONCLUSION

This chapter emphasises the major findings of the research study and summarises a derivation to the existing predictor model to include variables such as price sensitivity and brand equity. Insights to stakeholders based on these findings are discussed and limitations of the findings and derived model are outlined. To conclude, recommendations for future researchers are presented.

7.1 Summary of Research Objectives

This research study investigated the variables that were the most significant in influencing and promoting sales within emerging markets through the use of various advertising media efforts. The primary focus was to establish a more appropriate emerging market model that will enable the optimisation of brand sales within emerging markets and correspondingly provide an optimal media schedule which eases the allocation of budgetary resources effectively across respective media platforms whilst also providing a pricing strategy to optimise sales. Findings of the research confirmed Rishi (2012) and Sheth's (2011) suggestions that there are differences in consumer behavior between emerging markets and developed economies and thereby confirmed the requirement for marketers to address these differences in their marketing campaigns. Current predictor models are based on developed market behaviours and as such are ineffective for emerging markets without consideration for the emerging market landscape.

The research resulted in a proposed pricing and IMC strategy solution based on the extension of Naik and Raman's (2003) research. The model was empirically validated using extensive market data on advertising spend over various media types, including the price per unit and total unit sales over a two-year period (between 2012 and 2014). The data used was based on the washing detergent category in South Africa.

The theory focused on investigating marketing media platforms (which included internet, television, radio, press and outdoor media platforms), price sensitivities and consumer-based brand equity. This research was structured around the following four propositions:

1. The five respective media platforms (internet, television, radio, press and outdoor advertising) are unequal in their level of effectiveness and significant in influencing sales within emerging markets.

2. Consumer-based brand equity has a significant influence in promoting and determining sales within emerging markets.

3. Price has a significant influence in promoting and determining sales within emerging markets.

4. Models attempting to optimise sales derived in emerging markets differ from developed market models.

7.2 Research Findings

This findings of this study identified radio and television as the two main advertising media platforms, which contribute significantly to the influence of sales for a firm in emerging markets. The fact that other media platforms were not identified as significant contributors to sales could be attributed to the fact that radio and television has over 90% reach and penetration within the South African marketplace.

However, prior to this conclusion and with advertising efforts and affiliated variables perceived to influence marketing communication strategies in emerging markets, an initial model (6) was derived by incorporating the effects of multiple marketing media platforms (internet, television, press, radio and outdoor), consumer-based brand equity and price sensitivity. With the statistical analysis only proving two of the marketing media platforms (television and radio) and its respective synergistic effects, price and

consumer-based brand equity, the initial model could not be retained. With the results of rigorous statistical analysis, a final model (6) was proved to furnish the most statistically and theoretically sound results.

Although the results were influenced by a zero-inflated dataset (due to the inconsistent advertising spend across multiple media platforms via each brand), the final model derivation (7) is an extremely powerful predictor for advertisers wishing to maximise sales within emerging markets. With model (7) considering the most significant variables influencing emerging market consumer behaviour in terms of purchase decisions, it is able to guide advertisers as to their expected return on investment for their respective firms advertising efforts. The greatest portion attributable to accurate sale predictions is consumer- based brand equity, price sensitivity, radio, television and these two media platform's affiliated synergistic effects. The results of the insignificance of three of the media platforms and their respective interaction effects could however be attributable to the overpowering and extremely dominating influence of brand, price, radio and television in influencing sales, as well as the aforementioned inconsistent advertising spend across multiple media platforms. Correspondingly, it must also be noted that although only one interaction was proved significant in the final model (7), the synergistic effects of that media platform interaction furnished support that the impact of multiple media platform interactions could be much greater than evidenced in this study, should all affiliated interactions between all five media platforms be analysed (not just pairwise) and, correspondingly a more conclusive and consistent dataset be available and analysed.

Regardless of these inconsistencies, brand equity (which was derived from past investments) proved to be exceptionally significant in predicting sales in emerging markets. The resulting consequence of this consumer-based brand equity is that different perceptions of brands arise from the value added to a product/service as a result of past investments made in the marketing and communication of a brand. Typically these past investments are found to comprise the foundation of brand equity and are typically targeted through advertising and communication efforts. Strong brands with high consumer-

based brand equity have the right knowledge structures that exist in the minds of consumers (loyal and prospective) and marketing and communication strategies are seen to play a crucial role in shaping this knowledge. As such, regardless of only two media platforms proving significant in this study, marketing communications activities and correspondingly the communication through multiple media platforms, contribute significantly to consumer-based brand equity. As a result these are indirectly seen to drive and influence sales within the scope of this study. This ultimately leads the findings to conclude that proposition 1 and 2 are relevant and applicable, irrespective of the confounding results.

As outlined in the aforementioned paragraph, emerging market consumers are brand conscious and attribute significant value to their perception and associations of a brand within the market. This consumer- based brand equity often results in consumers who are willing to pay more for the purchase their associated or perceived premium brand or service from leading brands. This notion brings forth the validation of proposition 3, which confirms the significance of price within emerging market consumers' mindsets. Price was concluded as one of the major influencers of consumer purchase behaviour in emerging markets. This study identified three driving forces attributable to such influential price sensitivity amongst consumers in emerging markets, namely, quantity purchased, disposable income constraints and brand perception/quality. These findings contributed to the theoretical derivation of model (7) to produce suggested theoretically sound optimal pricing strategies that offered insights into a firm's decision to maximise their sales levels and as such, monetise the respective firm's advertising efforts.

The significance of the *brand* itself in promoting and influencing sales in emerging markets is of utmost importance for organisations and marketers and it is revered as the most significant influence of all the variables (marketing mediums, media interaction effects, price sensitivities and consumer-based brand equity) in predicting and determining sales within emerging markets.

Model (7) effectively incorporated the most significant variables proven to influence sales in emerging markets and proved to be the most parsimonious of the models presented. Model (7) builds on Naik and Raman's (2003) well established model to address the differences in the emerging market environment and provide a revised model for all markets which includes aspects of price and brand equity which has been absent in previously derived models and is important for marketing practitioners in devising sales strategies.

Although the final model (7) furnishes a valid and applicable model for advertisers and future researchers, the corresponding optimal IMC strategy formulations derived from the model, although theoretically sound, when applied practically with brand data, was flawed in that it was not necessarily proved to be practically applicable to real marketing problems. The resulting practical application limitations of the derived pricing and IMC strategy solutions is mainly due to an inconclusive and zero inflated data set used throughout the analysis and, as such, it is the hope of this researcher that future researchers and marketers obtain an exhaustive dataset from which to test the practical application of the theoretical developments in similar studies.

In conclusion, the findings from this study, specifically the findings from both models (6) and (7), conclude the inconsistency between variables proving to be significant in influencing sales in emerging markets compared to that of developed markets. This study furnishes strong support for the notion that developed market models and marketing theory and applications thereof, cannot be transferred directly into emerging markets with the same anticipated results as that of developed markets. The conclusion of the significance, application and usability of model (7) within emerging markets to predict optimum sales, reinforces the notion that proposition 1, 2 and 3 are valid and reliable within the context of this study. The concluding results and discussions thereafter support the research objectives initially purported and the literature was seen to provide substantial support for the final discussions and conclusions of this study.

7.3 Recommendations to Stakeholders

Although the findings of this research study demonstrate the significant influencers of sales to be consumer-based brand equity, price, two marketing media platforms and their respective interaction effects, the recommendation to marketing and brand managers facing future media schedule challenges is not to merely adopt model (7) and its derivations of an optimal media and pricing strategy when attempting to determine the optimal IMC strategy, but rather to consider model (6) and its respective derivations of optimal media schedules, affiliated budgeting and pricing thereof, with a more exhaustive dataset, which will ensure the optimal marketing communication strategy is suitable and practically applicable for the brand. In practice, advertisers should also estimate the model parameters for their specific brand in a given market by applying a suitable estimation approach which, based on Naik and Raman's (2003) research, the use of Kalman Filter Estimation is supported, thereafter determining the optimal budget and media mix equations from (14) and (15) respectively.

The resulting practical application limitations of the derived pricing and IMC strategy solutions requires stakeholders to ensure they obtain an exhaustive dataset from which to test the practical application of the theoretical developments in this study. Stakeholders are correspondingly urged to assess which experiences and impressions will have the most influence at each stage of the buying process in order to ensure brand associations are created. This understanding will help advertisers allocate communication spend more efficiently and design and implement the right communication programs. Armed with these insights, marketers can judge marketing communications according to the ability to affect experiences and impressions and build brand equity. Once brands have this right, the results of this study will furnish stronger support for firms that desire to optimise sales levels within their organisation.

With this study consisting of null values for a considerably large portion of advertising spend across mediums as well as the study's focus on pairwise

interaction effects, the synergistic effects and impact of the interactions could be much greater than evidenced in this study and marketing and brand managers are urged to consider interaction effects between all five media platforms as real and viable influencers on sales. Given a more exhaustive dataset as well as extending model (6) to include all five media platform interaction effects, marketers will be able to ascertain such synergistic effects on sales and use equations (14) and (15) (after estimating the model parameters for their specific brand in a given market by applying a suitable estimation approach) to determine their respective optimal budget and media mix.

7.4 Limitations of the Research

The results and conclusions made in this research study are limited to the five washing detergent brands investigated. Out of the five brands most of the media expenditure data was equal to zero, resulting in zero inflated data, which could potentially influence the significance and effect of marketing media platforms and their respective interaction effects. In addition, the findings outlined in this study are based on one consumer category, that of washing detergents and have not been tested on other categories which could yield different results.

With the data limitations outlined above, the resulting practical application limitations of the derived pricing and IMC strategy solutions caution the use of the derived optimal IMC strategy solutions presented in this study, prior to conducting additional research with a more comprehensive data set.

As discussed in chapter 4 the study only focused on the South African market, which has unique characteristics that are not necessarily representative of other emerging markets. As such, conclusions reached in this study cannot necessarily be transferred to other emerging markets. The consistency of results when compared with the findings of other previous literature reviews on emerging markets does however confirm that certain characteristics of the study may hold true in other emerging markets.

7.5 Recommendations for Future Research

With emerging markets being recognised as increasing opportunities for investments and development, it is evidenced that much remains to be done in marketing research and application thereof to achieve the desired levels experienced in developed economies.

Given this study and the conclusion that emerging markets are characterised by varying media effectiveness for selected media platforms, future research opportunities exist for researchers who have an exhaustive dataset for advertising spend across all mentioned mediums in this study, whereby the application of model (6) could be used to fit significant and consistent data which would be able to provide more rigorous and dynamic results for marketers and future researchers on the topic of marketing media and synergistic significance in influencing sales in emerging markets.

This study and analysis forms the basis of a targeted model for an emerging market. However, given this model and its limitations, it can be further improved through more in-depth analysis and modeling. Among some suggestions for further in-depth analysis and modeling are the following:

- The expansion of the analysed time frame to include more historical data on all five marketing channels. Ideally the database would go back in time to when the analysed brands were initially inserted in the market. This would provide a complete life-cycle view for the regarded products and would most likely offer a consistent database with non-null values for all marketing channels.

- Test the results of the model derivations for optimal IMC strategy solutions with an exhaustive dataset and, if similar results that were obtained in this study persist, new insights need to be taken into account in terms of the best mathematical way to derive both a theoretically sound and practically applicable optimal IMC strategy for both developed and developing markets.

- Expand the research to other emerging markets in order to test results and model derivations concluded from this study based in South Africa.

- Expand the research to other categories and brands in order to test results and model derivations concluded from this study based on the washing detergent category.

- A more-in-depth analysis on interaction effects between marketing media platforms (not limited to pairwise interactions)

- A qualitative analysis can be performed on brand perception in South Africa in order to determine the reasons for the continued growth of brand equity as a powerful factor in the purchase decision, while also offering companies a proper set of action tools for improving consumer-based brand equity.

7.6 Conclusion

The research study successfully achieved the research objectives formulated in chapter 3 and provides insight to stakeholders seeking to optimise sales for a firm through optimal marketing strategies and decisions regarding the optimal media and pricing strategy for firms in South Africa through the use of an extended model that was derived from the data.

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APPENDIX

1. Media Penetration In South Africa (SAARF, 2014)

		Total	Percentage Penetration	Total Penetration
Total	***Audience(000)***	37 665		
	Resps	25 510		
	%Col	100,0		
	%Row	100,0		
	Index	100,0		
Total (Any) Television	***Audience(000)***	35 494	**Television**	**Television**
	Resps	24 622	97%	**97%**
	%Col	94,2		
	%Row	100,0		
	Index	100,0		
Total Radio (Any)	***Audience(000)***	35 829		**Radio**
	Resps	24 277	95%	**95%**
	%Col	95,1		
	%Row	100,0		
	Index	100,0		
Total Out of home	***Audience(000)***	35 367	**Outdoor**	**Outdoor**
	Resps	24 523	96%	**96%**
	%Col	93,9		
	%Row	100,0		
	Index	100,0		
Total (Any) AMPS Newspaper	***Audience(000)***	17 434	**Newspaper**	**Press (Newspaper & Magazine)**
	Resps	13 442	53%	**55%**
	%Col	46,3		
	%Row	100,0		
	Index	100,0		
Total (Any) AMPS Magazine	***Audience(000)***	17 657	**Magazine**	
	Resps	14 469	57%	
	%Col	46,9		
	%Row	100,0		
	Index	100,0		
Total Smartphones	***Audience(000)***	15 573	**Smartphones**	**Smartphones**
	Resps	12 802	50%	**50%**
	%Col	41,3		
	%Row	100,0		
	Index	100,0		
Total Extended Internet (Any) (Inclusive of Internet Cellphone Activities-Ever)	***Audience(000)***	16 323	**Internet**	**Internet**
	Resps	13 721	36%	**36%**
	%Col	43,3		
	%Row	100,0		
	Index	100,0		

2. **Application of brand equity coefficient being constant across brands over time**

Each brand's uniqueness (brand equity) drives sales in addition to the input variables (price, marketing media platforms, interaction and carryover effects). Each brand's respective equity intercept (derived by fitting the chosen model to the respective brands data) is represented by α_i where α_i is the brand effect/influence that varies across brands but is constant over time. This infers that the coefficients for the **input variables** are going to be the same for all brands and will be the **same for all time periods** – With brands exhibiting differing brand equity, the intercepts themselves (α_i) will be different for each brand as (α_i) will represent each brand's respective co-efficient derived by fitting the model to data. Thus, the difference in each respective brand equity scenario is reflected by the intercept (α_i) , which will be different based on each brand's respective brand equity.

Let the model used in the following two examples be represented by the following equation:

$$S_{it} = \alpha_i + \theta * {P_{it}}^2 + \beta_1 u_1 + \beta_2 u_2 + \kappa_{12} u_1 u_2 + \lambda_i S_{i,t-1}$$

and, Using Omo and Sunlight as the brand examples the assumption can be explained as follows:

Example 1: After fitting the model to the data and calculating Omo's coefficient Omo's sales could be:

*Sales (next week) = 0.576138 - 0.00115*Price2 + 0.012978*Sqrt(TV) + 050362*Sqrt(Radio) + 0.00154*Sqrt(TV*Radio) + Omo _CarryoverEffect *Sales (lastweek).*

Example 2: After fitting the model to the data and calculating Sunlight's coefficient sales could be:

*Sales (next week) = 1.199254-0.00115*Price2 + 0.012978*Sqrt(TV) + 050362*Sqrt(Radio) + 0.00154*Sqrt(TV*Radio) + Sunlight_CarryoverEffect *Sales (lastweek).*

Thus each brands α_i estimates (in red) change across brands depending on what brand equity co-efficients are the results of fitting a chosen model to a brands data they wish to use. Each respective brand's carryover effect changes (in blue), however, these changes are accounted for the carryover effect variable in the model.

α_i is constant over time because the *prediction* of Omo / Sunlight sales two weeks from now, will result in the model changing as follows:

Example 1: Omo – Prediction Two Weeks from Now

*Sales (in 2weeks) = 0.576138 -0.00115*Price2 + 0.012978*Sqrt(TV) + 050362*Sqrt(Radio) -0.00154*Sqrt(TV*Radio) + Omo _CarryoverEffect *Sales (next week).*

Example 1: Sunlight – Prediction Two Weeks from Now

*Sales (in 2weeks) = 1.199254-0.00115*Price2 + 0.012978*Sqrt(TV) + 050362*Sqrt(Radio) + 0.00154*Sqrt(TV*Radio) + Sunlight_CarryoverEffect *Sales (next week).*

Thus, the only thing that changes is the time period (in green) but none of the parameters change and thus α_i is constant over time.

3. Candidate Models (Initial Model (6) Fitting)

Internet_OOH_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.286319	0.4084	3.15	0.0021	sig	Sunlight
Price_sq	1	-0.00105	0.000255	-4.10	<.0001	sig	
X1_sqt	1	0.011113	0.1666	0.07	0.9469	ns	Internet
X2_sqt	1	-0.00265	0.0257	-0.10	0.9181	ns	OOH
Gamma1_sqt	1	0.002262	0.0216	0.10	0.9169	ns	Internet*OOH
Brand1	1	0.075472	0.4572	0.17	0.8692	ns	Maq
Brand4	1	0.682375	0.2448	2.79	0.0062	sig	Omo
Brand5	1	1.953711	0.5733	3.41	0.0009	sig	Skip
Brand7	1	-0.28527	0.2756	-1.04	0.3027	ns	Surf

Internet_Press_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.254413	0.3731	3.36	0.0010	sig	Sunlight
Price_sq	1	-0.00103	0.000247	-4.16	<.0001	sig	
X1_sqt	1	-0.02886	0.1549	-0.19	0.8526	ns	Internet
X3_sqt	1	-0.08007	0.0520	-1.54	0.1263	ns	Press
Gamma2_sqt	1	0.027678	0.0850	0.33	0.7453	ns	Internet*Press
Brand1	1	0.11948	0.4287	0.28	0.7810	ns	Maq
Brand4	1	0.773885	0.2541	3.05	0.0029	sig	Omo
Brand5	1	2.007864	0.5514	3.64	0.0004	sig	Skip
Brand7	1	-0.28584	0.2733	-1.05	0.2978	ns	Surf

Internet_Radio_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.302086	0.3912	3.33	0.0012	sig	Sunlight
Price_sq	1	-0.00111	0.000262	-4.23	<.0001	sig	
X1_sqt	1	-0.03606	0.1677	-0.21	0.8302	ns	Internet
X4_sqt	1	0.022829	0.0134	1.70	0.0918	ns	Radio
Gamma3_sqt	1	0.002924	0.0158	0.19	0.8533	ns	Internet*Radio
Brand1	1	0.019487	0.5201	0.04	0.9702	ns	Maq
Brand4	1	0.562056	0.2817	2.00	0.0484	sig	Omo
Brand5	1	2.142556	0.5794	3.70	0.0003	sig	Skip
Brand7	1	-0.29654	0.2316	-1.28	0.2030	ns	Surf

Internet_TV_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.200294	0.4185	2.87	0.0049	sig	Sunlight
Price_sq	1	-0.00103	0.000273	-3.75	0.0003	sig	
X1_sqt	1	-0.17306	0.3123	-0.55	0.5805	ns	Internet
X5_sqt	1	0.004638	0.00750	0.62	0.5375	ns	Television
Gamma4_sqt	1	0.007764	0.0123	0.63	0.5289	ns	Internet*TV
Brand1	1	0.106225	0.4534	0.23	0.8152	ns	Maq
Brand4	1	0.576882	0.3019	1.91	0.0585	ns	Omo
Brand5	1	1.904705	0.6122	3.11	0.0023	sig	Skip
Brand7	1	-0.26648	0.2676	-1.00	0.3213	ns	Surf

OOH_Press_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.160874	0.3876	2.99	0.0034	sig	Sunlight
Price_sq	1	-0.00096	0.000234	-4.10	<.0001	sig	
X2_sqt	1	0.001652	0.0274	0.06	0.9520	ns	OOH
X3_sqt	1	-0.0996	0.0847	-1.18	0.2418	ns	Press
Gamma5_sqt	1	0.00425	0.0124	0.34	0.7328	ns	OOH*Press
Brand1	1	0.104223	0.4268	0.24	0.8075	ns	Maq
Brand4	1	0.722361	0.2404	3.00	0.0033	sig	Omo
Brand5	1	1.897837	0.5271	3.60	0.0005	sig	Skip
Brand7	1	-0.26734	0.2713	-0.99	0.3264	ns	Surf

OOH_Radio_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.182165	0.4173	2.83	0.0054	sig	Sunlight
Price_sq	1	-0.00107	0.000253	-4.25	<.0001	sig	
X2_sqt	1	0.014696	0.0302	0.49	0.6278	ns	OOH
X4_sqt	1	0.041084	0.0185	2.22	0.0285	sig	Radio
Gamma6_sqt	1	-0.00305	0.00270	-1.13	0.2613	ns	OOH*Radio
Brand1	1	-0.00671	0.5335	-0.01	0.9900	ns	Maq
Brand4	1	0.537074	0.2866	1.87	0.0635	ns	Omo
Brand5	1	2.150567	0.5649	3.81	0.0002	sig	Skip
Brand7	1	-0.28071	0.2335	-1.20	0.2317	ns	Surf

OOH_TV_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.173743	0.4330	2.71	0.0077	sig	Sunlight
Price_sq	1	-0.00102	0.000270	-3.78	0.0002	sig	
X2_sqt	1	0.0036	0.0334	0.11	0.9144	ns	OOH
X5_sqt	1	0.005686	0.00849	0.67	0.5044	ns	Television
Gamma7_sqt	1	-0.00021	0.000979	-0.21	0.8314	ns	OOH*TV
Brand1	1	0.082887	0.4480	0.19	0.8535	ns	Maq
Brand4	1	0.587749	0.3024	1.94	0.0544	ns	Omo
Brand5	1	1.899908	0.6135	3.10	0.0025	sig	Skip
Brand7	1	-0.26533	0.2742	-0.97	0.3351	ns	Surf

Press_Radio_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.167769	0.3600	3.24	0.0015	sig	Sunlight
Price_sq	1	-0.00101	0.000228	-4.42	<.0001	sig	
X3_sqt	1	-0.06008	0.0564	-1.07	0.2888	ns	Press
X4_sqt	1	0.03047	0.0131	2.32	0.0221	sig	Radio
Gamma8_sqt	1	-0.00615	0.00703	-0.87	0.3834	ns	Press*Radio
Brand1	1	0.036319	0.4733	0.08	0.9390	ns	Maq
Brand4	1	0.604149	0.2845	2.12	0.0358	sig	Omo
Brand5	1	2.003053	0.5083	3.94	0.0001	sig	Skip
Brand7	1	-0.2737	0.2238	-1.22	0.2239	ns	Surf

Press_TV_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.122784	0.3897	2.88	0.0047	sig	Sunlight
Price_sq	1	-0.00099	0.000248	-4.00	0.0001	sig	
X3_sqt	1	-0.01489	0.1005	-0.15	0.8825	ns	Press
X5_sqt	1	0.007171	0.00770	0.93	0.3538	ns	Television
Gamma9_sqt	1	-0.00194	0.00297	-0.65	0.5143	ns	Press*TV
Brand1	1	0.102362	0.4167	0.25	0.8064	ns	Maq
Brand4	1	0.625776	0.2866	2.18	0.0310	sig	Omo
Brand5	1	1.888832	0.5512	3.43	0.0008	sig	Skip
Brand7	1	-0.25451	0.2627	-0.97	0.3347	ns	Surf

Radio_TV_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Brand6	1	1.199254	0.4321	2.78	0.0064	sig	Sunlight
Price_sq	1	-0.00115	0.000284	-4.07	<.0001	sig	
X4_sqt	1	0.050362	0.0179	2.81	0.0058	sig	Radio
X5_sqt	1	0.012978	0.00846	1.53	0.1276	ns	Television
Gamma10_sqt	1	-0.00154	0.000722	-2.14	0.0347	sig	Radio*TV
Brand1	1	0.023435	0.5090	0.05	0.9634	ns	Maq
Brand4	1	0.576138	0.3136	1.84	0.0687	ns	Omo
Brand5	1	2.167625	0.6322	3.43	0.0008	sig	Skip
Brand7	1	-0.30183	0.2111	-1.43	0.1554	ns	Surf

4. Candidate Models (Final Model (7) Fitting)

Sunlight_Skip_Radio_TV_Brand Equity_Price

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
Skip	1	3.001222	0.9553	3.14	0.0030	sig	Skip
Price_sq	1	-0.00096	0.000287	-3.34	0.0017	sig	
X4_sqt	1	-0.19631	0.2595	-0.76	0.4535	ns	Radio
X5_sqt	1	-0.00151	0.0149	-0.10	0.9195	ns	Television
Gamma10_sqt	1	0.013403	0.0154	0.87	0.3887	ns	Radio*TV
Brand6	1	-1.82936	0.6176	-2.96	0.0049	sig	Sunlight

Brand Equity_Price_TV_Radio_Skip

VarName	*DF*	*Estimate*	*StdErr*	*tValue*	*P_Value*	*Significant*	*Description*
All Other Brands	1	0.757052	0.3272	2.31	0.0224	sig	All Other Brands
Price_sq	1	-0.00079	0.000185	-4.24	<.0001	sig	
X4_sqt	1	0.050016	0.0158	3.16	0.0020	sig	Radio
X5_sqt	1	0.019688	0.00672	2.93	0.0040	sig	Television
Gamma10_sqt	1	-0.00138	0.000628	-2.19	0.0305	sig	Radio*TV
Brand5	1	1.355338	0.3982	3.40	0.0009	sig	Skip