

Publication Bias and the Market Orientation-Performance Nexus Literature

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Abstract

In the past decade, a number of studies have conducted meta-analyses of the market orientation-performance literature. The purpose of this paper is to investigate publication bias in the field of marketing with a specific emphasis on the market orientation-performance relationship. This study adds to existing knowledge by explicitly accounting for both publication bias and the control for important variables that influence the market orientation-performance measure. Firstly, we conduct a quantitative survey of the literature on market orientation-performance from various countries and create a database of market orientation-performance studies for each country examined in the literature. Next, we estimate the average effect size, publication bias and examine the role of study specific effects on the observed market orientation-performance measure. From our findings, though the funnel plots emanating from data used for two of our models suggest the existence of publication bias, the inclusion of other variables which explain the differences in market orientation-performance coefficients result in the absence of publication bias in our third model. We subsequently present the implications of our findings for managers and scholars within the contexts of the market orientation-performance and publication bias literature.

Keywords: market orientation, performance, meta-analysis, publication bias

Introduction

'Bias' is used commonly in different contexts, therefore, it is important to define (operationalise) bias (publication). This is the systematic error induced in a statistical inference by an author expecting to secure

publication status. Begg & Berlin (1988) explained that such a bias can only be present if the inference drawn in a study influences the decision to publish. This bias arises from the preference of authors (Cho and Bero, 1996; Davidson, 1986; Needleman, 1996), editors (Armstrong, 1997), or reviewers (Goodstein and Brazis, 1970; Lloyd, 1990; Mahoney, 1977; Speck, 1993) for some particular results; usually those that are statistically significant (Begg and Berlin, 1988; Greenwald, 1975; Hubbard and Armstrong, 1992; Sterling, Rosenbaum, and Weinkam, 1995) or consistent with theory (Armstrong and Hubbard, 1991; Kuhn, 1962; Stanley, 2005). Publication bias can seriously exaggerate the magnitude of the effect size (Havranek and Irsova, 2012).

Evidence from a large survey of economics meta-analyses, showed the magnitude of publication bias decreased with more theory competition in the particular research area (Doucouliagos and Stanley, 2013). Similar evidence exists in the field of marketing. In Hubbard and Armstrong's (1992) thought-provoking paper which examined whether null results were becoming an endangered species in marketing, they found that editorial procedures tended to promote studies that rejected the null hypothesis, suggesting the possibility of publication bias, an observation that had been made in biomedical sciences (Greenwald, 1975), medical studies (Simes, 1986) and by psychologists (Rosnow and Rosenthal, 1989), economists (Feige, 1975) and statisticians (Salsburg, 1985).

The possibility of publication bias in any

field can result in the creation of serious knowledge gaps in that scholarly area. When this happens, the scholarly world and business practitioners will hardly have the opportunity to benefit from insightful findings that exhibit non-significant results. This will result in a situation where researchers continue to research that issue, until by chance, a significant result occurs. Hubbard and Armstrong (1992) conclude that bias against the publication of non-significant findings would help to prevent researchers from reinvestigating blind alleys. In the world of business, limited publications of non-significant research findings will deprive practitioners of knowledge that would help them to subject traditionally held business paradigms to further analyses in developing strategies for their operations.

In this study of publication bias, market orientation is selected because of the significant role this concept has played in business and management research over the last two decades and its relevance to practitioners and scholars alike. Moreover, the authors have conducted substantial research in this field in Europe and Africa over the past decade and had the existing literature, information and data to analyze in connection with this research (Appiah-Adu, 1998a; Appiah-Adu and Blankson, 1998; Appiah-Adu and Ranchhod, 1998; Morgan, Katsikeas and Appiah-Adu, 1998; Appiah-Adu and Singh, 1998; Appiah-Adu, 2009). Further, any revealing findings would be of interest to scholars and provide suggestions to change the way the scholarly world perceives marketing-related papers with non-significant findings, providing evidence that encourages

innovation. Such findings should offer practitioners a wider range of evidence, assumptions and options on which to build their models in an increasingly sophisticated business environment.

Market orientation is a pertinent subject for analyzing and gaining an understanding of how organisations behave (Narver and Slater, 1990). It is posited that market orientation entails an implementation of the marketing concept because it provides organisations with the capacity to foresee, respond to and exploit changes in the business environment, thus resulting in greater success (Kohli and Jaworski, 1990; Shoham, Rose and Kropp, 2005).

Over the last two and half decades scholars have examined a number of precursors and effects of market orientation to gain further insights into its significance in organizations and markets (Bhuyan, 1998; Grinstein, 2008; Kohli and Jaworski, 1990; Lagat, Chepkwony and Kotut, 2012; Narver and Slater, 1990; Vieira, 2010). In spite of the plethora of studies on the link between market orientation and organizational success, conclusions from these studies indicate inconsistent findings. Consequently, the body of literature depicts varied effects of the relationship. For example, these findings differ from non-significant (Appiah-Adu, 1998a; Müller Neto, 2005) or negative Bhuyan (1997) to positive (Jaworski and Kohli, 1996; Slater and Narver, 1994a). One way of determining the reasons for these mixed findings is to conduct a meta-analysis of a number of papers exploring the market orientation-performance relationship to explore the effects of possible publication

bias on the findings and evaluate the universal applicability of the conclusions (Brown and Peterson, 1993; Havranek and Irsova, 2012).

It is conceivable to suggest that various global factors would impact market orientation. Clearly, amalgamating studies across countries and continents makes it possible to obtain an overview of the dynamics of market orientation and its impact on performance. Drawing on the aforementioned issues, this research attempts to find solutions to four questions:

- 1) Is there publication bias in the market orientation-performance literature?
- 2) What is the average effect of market orientation on performance?
- 3) What is the role of study characteristics on market orientation-performance estimates?
- 4) Does accounting for study characteristics influence publication bias?

This paper is unique for two reasons. First, most recent meta-analytic studies adopted an approach that weighed the effect size by the sample size, performed Z and/or Fisher transformation. These have relied on procedures recommended by Bamberger, Klugar and Suchard (1999) and Hunter and Schmidt (2004) among others. One of the reasons for these transformations of the effect size is to control for publication bias, the existence of which is not always shown in the analysis. In a rare case, regression analysis was performed relating the mean effect size to categorical and continuous variables separately - see Rodriguez Cano, Carrillat and Jaramillo (2004).

In this market-orientation-performance study, we examine the subject of publication selection bias, effect size and specific study characteristics, jointly. This joint estimation proved to be efficient in identifying the role of effect size and specific study characteristics and detecting publication bias. Secondly, the study employed only market orientation-performance regression coefficients unlike others such as Grinstein (2008) and Vieira (2010), that used correlation coefficients. The former is superior to the latter because the former controls for factors that the latter is incapable of doing.

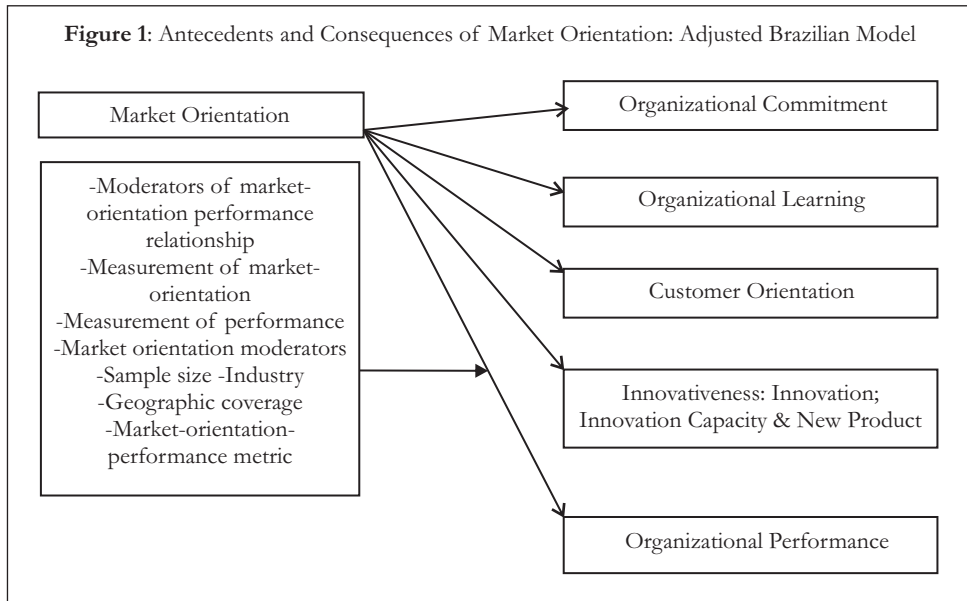
The remainder of the paper is structured as follows: first, we review the market orientation literature and adapt a theoretical model of its consequences. In the next section, we present the methodology. The results are presented in section four and the discussions and managerial implications are captured in section five. Finally, we conclude with some recommendations for future research.

Theoretical context

The phenomenon of publication selection bias is prevalent in several fields of economics (business) research (Doucouliagos and Stanley, 2011). The economics-research-cycle theory (Goldfarb, 1995) has been supported in some areas of applied economics by others (e.g. Stanley, 2008; Havranek, 2010). This theory posits that ground-breaking papers in the fields of economics and related areas such as

business tend to be characterized by sizeable and significant estimates. This is probably because such findings do not only persuade the reviewers and editors, but also surmount entry barriers, leading to the birth of a pristine empirical domain. Ensuing studies tend to lend credence to the sizeable estimates of this new field. However, with time, conflicting findings become preferable, because they are generally deemed more fascinating by the editors, reviewers and target audience. Owing to the likelihood of publication bias and the research cycle in the market orientation-performance literature, we chose to analyse a wide collection of empirical studies, evaluating the findings of a variety of scholars. Additionally, as opposed to selective preferences, conclusions drawn from the extant literature are not contingent on any specific methodology adopted by the primary research to determine the constituents of market orientation and its impact on performance.

This study adapts the model propounded by Kirca, Jayachandran and Bearden (2005), which illustrates the relationships among the most commonly investigated effects of market orientation. Given the purpose of this paper, the market orientation-performance relationship is given prominence to the exclusion of other consequences such as organisational commitment; organisational learning; customer orientation; and innovativeness. Consequently, Figure 1 presents the adjusted theoretical model.



Source: author based on Kirca et al (2005).

If market orientation provides an organisation with the ability to proactively adapt to evolving customer demands and preferences, it is reasonable to suggest that market orientation would have a positive impact on business success. The extant literature indicates that organisations with superior performance are those that tend to be abreast of current and emerging trends in order to proactively respond to or influence developments within their business environments (e.g. Appiah-Adu, 2009; Sheth, 2011). Drawing from the Resource Based View it can be inferred that an organisation which possesses differential resources can leverage these assets to develop superior strategies and performance (Barney, 1991). If a strong market orientation provides an organization with an advantage to enhance its resources and in itself is considered a market differential, a focus on this strategy should lead to enhanced performance

(Perin, Sampaio and Henriqson, 2005). Consequently, it is postulated that market orientation will have a positive impact on performance (Atuahene-Gima, Slater and Olson, 2005; Deshpandé and Farley, 1998).

Rodriguez Cano et al. , Carrillat and Jaramillo (2004), Shoham, Rose and Kroppet al. (2005), Ellis (2006), Grinstein (2008) and Vieira (2010) have meta-analysed studies in market orientation and performance. To investigate the impact of market orientation on long term success, Rodriguez Cano , Carrillat and Jaramillo et al. (2004) conducted a meta-analysis and found that the relationship between market orientation and business performance is positive and consistent worldwide. One of the unique contributions of this research is a sample that included studies conducted in 23 countries spanning five continents. The moderating effects of

business objective (profit, not-for-profit), industry type (manufacturing, service), and socioeconomic development, gross domestic product per capita, human development index, and Hofstede's individualism cultural dimension were examined. Stronger correlations between market orientation and business performance were found for not-for-profit compared to profit firms and service compared to manufacturing firms.

The relationship between market orientation and alternative strategic orientations was authored by Shoham et al. (2005). They examined the effect of market orientation on different orientations, and identified the orientations that are more likely to be combined with market orientation. The study employed a meta-analysis procedure to synthesize empirical results on the relationship between market orientation and innovation, learning, entrepreneurial, and employee orientations. Its findings suggest that market orientation is strongly correlated with learning, entrepreneurial, and employee orientation. The authors suggested that market orientation should shift its focus, moving from the study of its direct effect on business performance to the study of various combinations of strategic orientations that firms can pursue in different situations, studying how the more successful market-oriented firms balance between market orientation and other strategic orientations. This was the first meta-analysis study to examine the relationships between market orientation and alternative strategic orientations.

Ellis (2006) assessed quantitatively the impact of market orientation on the performance of the firm. It was based on

a substantive meta-analysis quantitatively which summarized the results of empirical studies of the direct and indirect impact of market orientation on three outcomes. The meta-analysis assessed the influence of methodological variables on explained variances in performance. It was found that the direct, indirect and total impacts of market orientation on performance were all significant. Additionally, the geographic location of the study and the performance measure used (but not the scale) affected explained variance. The authors suggested that the impact of market orientation might be stronger than previously thought due to the indirect paths not considered in previous research. Moreover, the strength of its impact depends on the country in which it was implemented, suggesting that managers should expect higher payoffs in less developed countries. The findings of this study refined the body of knowledge concerning the impact of market orientation on business performance, and thereby offered an improved conceptual framework for marketing planners.

Grinstein's (2008) study, based on quantitative evidence drawn from a meta-analysis of 56 studies (58 samples) conducted in 28 countries revealed that market orientation is a generic determinant of firm performance. However, stronger effects were found for studies set in large, mature markets and when market orientation was measured using Kohli, Jaworski and Kumar's (1993) MARKOR scale. The meta-analysis also revealed that the value of a market orientation weakens in proportion to the cultural distance separating the home market from the USA. This study extended previous research by: (i) providing evidence of

measurement moderators that inhibit the generalization of results obtained from studies using different scales and performance variables; (ii) establishing benchmark effect sizes for specific regions around the world; and (iii) revealing that the managerial value of market orientation is significantly affected by the cultural and economic characteristics of the host country.

In the most recent market orientation meta-analysis study, Vieira (2010) showed that the relationship between market orientation and business performance is positive and strong ($r = 0.39$). This study aggregated a sample size of 4,537 in 27 countries from seven meta-analyses on market orientation. It emerged that there is a positive, strong and consistent relationship between market orientation and

performance across countries ($r = 0.33$).

Methodology

We accessed data for the study from diverse publishers' websites and databases namely, Oxford University Press, Wiley, Taylor & Francis, Sage and Emerald among others. Databases included EBSCOHost, Google Scholar, Cab Abstract and DOAJ. Owing to the methodology we employed, only studies that reported regression coefficients of market orientation and performance relationship were included in the data set. The list of eligible data is presented in Table 1 (See Appendix).

Following Begg and Berlin (1988) and Gorg and Strobl (2001) we specified the publication bias model as:

$$(1) \quad \log|t_i| = \alpha_1 + \alpha_0 \log(d.f.)_i + \psi_i$$

Where, t is the absolute t-statistics and α_1 are coefficients and ψ_i is error term. However, Stanley (2005) recommended the use of number of observations in

place of degrees of freedom (d.f.) since it makes no practical difference. Hence 1 can be re-formulated as:

$$(2) \quad \log|t_i| = \alpha_1 + \alpha_0 \log(\text{number of observations})_i + \psi_i$$

It must be acknowledged however, that, number of observations is larger than degrees of freedom as the latter is reduced by the number of parameters estimated from the model. We note therefore, that, nominal differences may be observed in the results using number of observations and degrees of freedom.

$\alpha_0 = 1$ means that no publication bias is present.

In the absence of publication bias, the absolute value of t-statistic should in-

crease with more degrees of freedom; that is: the absolute value of the t-statistic should be directly proportional to the logarithm of the square root of the number of degrees of freedom (Card and Krueger, 1995; Görg and Strobl, 2001; Stanley, 2005; and Doucouliagos and Stanley, 2009). Stanley, (2005) rightly noted that equation 2 should rather be interpreted as a test for genuine empirical effect.

An alternative that can be used to detect

the significance and magnitude of both publication bias and a genuine underlying effect is a funnel plot and equation 3 (Card and Krueger, 1995; Görg and Strobl, 2001; Stanley and Doucouliagos, 2012). The funnel plot presents the estimate (coefficient) on the horizontal axis and their precision often the inverse of the standard error on the vertical axis. The most precise estimates will be close to the genuine underlying effect, while imprecise estimates will be more dispersed.

$$(3) \quad e_i = e_0 + \beta_0 SE(e_i) + u_i$$

where β_0 measures asymmetry of the funnel plot and the strength of publication bias. Beyond measuring effect size and publication bias, results from market orientation-performance (MO-performance) studies differ in several aspects; the market-orientation instrument used,

$$(4) \quad e_i = e_0 + \beta_0 SE(e_i) + \beta_1 MOJK + \beta_2 MOM + \beta_3 MONS + \beta_4 MOPW + \beta_5 MOD + \beta_6 MODLO + \beta_7 MODT + \beta_8 MODMP + \beta_9 MODPMO + \beta_{10} MODRMO + \beta_{11} SS + \beta_{12} PMO + \beta_{13} PMNPP + \beta_{14} PMF + \beta_{15} RGUSA + \beta_{16} PGEUROPE + \beta_{17} INMANUF + \beta_{18} INS + \beta_{19} MOPC + u_i$$

Where e_0 becomes the effect size, β_0 is the strength of publication bias. If β_0 is statistically significant, then there is publication bias. Otherwise, then, there is no publication bias. Also, the size and statistical significance of e_0 reflects the size and significance of the effect size. This approach to jointly estimate the effect size and publication bias is more efficient than alternative approaches used extensively, more specifically in meta-analyses of the market orientation literature. It must be noted that, the method and data did not permit isolation of country, industry or study specific publication bias. Therefore, the expectation of a specific threshold of

Effectively, the cloud of the estimates should resemble an inverted funnel. Publication bias is then established by the asymmetry of the funnel plot. If publication bias is absent, all imprecise estimates have the same chance of being reported, and the funnel is symmetric.

Owing to subjectivity in the interpretation of the funnel plot, a more objective form of test is 3:

the performance measure employed and moderating variables. Others are the industry the study covers, geographical location of the organization studied and whether the MO-performance measure is standardized or not. These differences are accounted for in equation 4.

publication bias described by a statistical measure for a study may not be possible.

The contribution of multiple observations from some studies to the metadata set could result in metadata being influenced by results from those studies. While acknowledging this possibility, we were unable to employ cluster(ed) analysis and multilevel modelling because of limitations of the size of metadata set.

With the exception of SE (standard error) and SS (sample size), all others are dummy variables. Where the study used Jaworski and Kohli's measure of market orienta-

tion, then MOJK takes 1 and zero otherwise. In cases where the study adopted mixed measures, then MOM takes 1 and zero otherwise. MONS equals 1 if Narver and Slater's measure of market orientation is employed. MOPW equals 1 if Pelham and Wilson's measure of market orientation is used. The excluded measure is Kohli et al (1993). MOD equals 1 if no moderator variable is included in the market orientation-performance model and zero otherwise. The specific moderator variables are captured by MODLO-learning orientation, MODT-turbulence (market, technological and competitive), MODM-marketing's power within the organization, MODPMO-proactive market orientation and MODRMA-reactive market orientation. The excluded group of moderators is strategic consensus, stra-

tegic mission rigidity, risk-taking rewards and long-term rewards. Measures of performance are captured as follows: PMO-overall performance, PMRMS-relative market share, PMNPP-new product performance and PMF-financial measures of performance such as ROA, ROI, ROE and profit margin). The excluded performance measure is sales growth. RGUSA represents studies in USA while RGEUROPE represents studies in Europe. The excluded regions are Asia and Africa. INMANUF captures manufacturing which is equal to 1 and zero otherwise. INS equals 1 and zero otherwise. The excluded industry is multi-industry. MOPC equals 1 if the coefficient of market orientation performance relationship is standardized and zero otherwise.

Results

Table 2: Estimated Results

Dependent: coefficient of performance market orientation relationship

Dependent variable	MOPE	MOPE/SE	MOPE
Explanatory Variables	Model 1 ^{ab}	Model 2	Model 3
Constant (e_0)	-0.802619*** (0.234465)	-	7.897799*** (1.515304)
Standard Error (β_0)	6.011429*** (0.842725)	-	0.507689 (0.840220)
Constant (β_0)	-	2.191479** (0.899799)	-
Inverse of Standard Error (e_0)	-	-0.130064 (0.106113)	-
MOJK	-	-	-7.384089*** (0.920185)
MOM	-	-	0.011871 (0.309204)
MONS	-	-	-7.787494*** (1.152377)
MOPW	-	-	-7.044879*** (0.971821)
MOD	-	-	0.672148* (0.252026)

Dependent variable	MOPE	MOPE/SE	MOPE
Explanatory Variables	Model 1 ^{ab}	Model 2	Model 3
MODLO	-	-	0.157685 (0.309361)
MODT	-	-	-0.066171 (0.476933)
MODM	-	-	0.129366 (0.478427)
MODPMO	-	-	-0.171694 (0.348171)
MODRMO	-	-	0.226630 (0.347043)
SS	-	-	-0.002972 (0.002671)
PMO	-	-	-1.083693 (0.643506)
PMRMS	-	-	-0.847978 (0.759231)
PMNPP	-	-	-0.946670 (0.794129)
PMF	-	-	0.042781 (0.222743)
RGUSA	-	-	-7.276988*** (0.9653219)
RGEUROPE	-	-	-1.015783 (0.585028)
INMANUF	-	-	1.218155 (0.781854)
INS	-	-	-0.428063 (0.335520)
MOPC	-	-	-0.563780 (0.624815)
Model properties			
R squared	0.599455	0.043092	0.981434
R squared Adjusted	0.587674	0.014947	0.953584
F statistic	50.88435***	1.531094	35.24085***
Normality test			
Jarque-Bera	4.057104	0.999716	0.797789
Serial Correlation tests			
F-statistic	0.326745	0.042511	1.652495
Obs*R-squared	1.103446	0.095396	11.18406*c

Heteroscedasticity test			
F-statistic	72.91123***	2.570197	0.930980
Obs*R-squared	24.55125***	2.530123	20.97790
Scaled explained SS	33.78593***	1.391083	2.057951

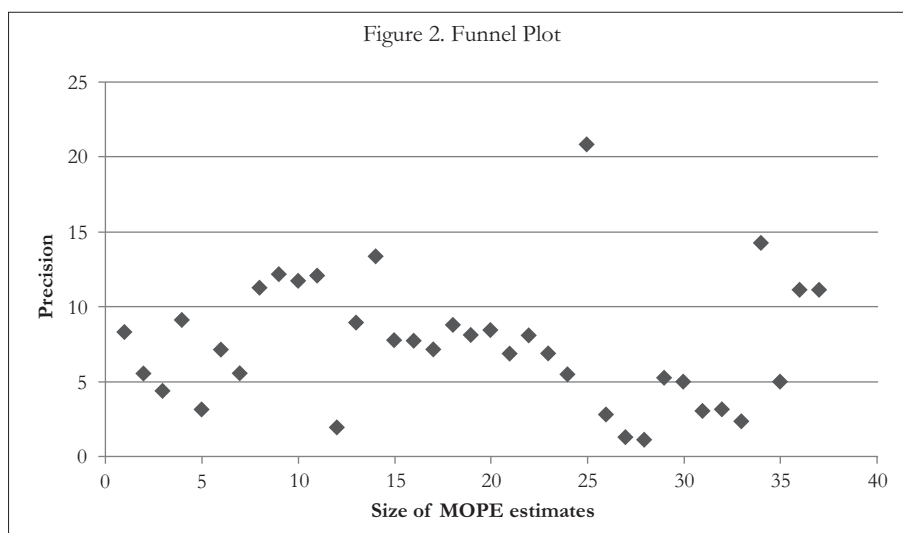
a. Standard errors in brackets.

b. ***, ** and * are 1%, 5% and 10% levels of significance respectively.

c. Though the test showed weak second order serial correlation, the inclusion of the AR (2) term resulted in statistically insignificant coefficient. Also, there were no changes in the levels of significance of the coefficients of the model. Hence, the second order weak serial correlation was ignored.

Equation 3 was estimated using OLS. The results (model 1) in Table 2 show that there is overall fit with statistically significant F test and no presence of serial correlation evidenced by statistically insignificant F and Obs*R squared statistics. Also, the model shows normally distributed error term. However, the heteroscedasticity tests show non-constant variances. The ameliorations in equation 4 were estimated (Model 2). The results show absence of heteroscedastic error as

well as the absence of serial correlation and existence of normally-distributed error term. However, the R squared and adjusted R squared dwindled drastically, resulting in insignificant model fit shown by statistically insignificant 1.531094 F-statistic. Despite the violation of OLS properties of Model 1 and poor fit of model 2, together with the funnel plot (Figure 2), one can conclude that there exists publication bias.



The study proceeded to assess the effect of study characteristics on the estimated coefficients of MO-performance regressions. Model 3 shows drastic improve-

ment in the R squared and adjusted R squared values. The variances are homoscedastic. The F-statistic of the serial correlation LM test is statistically insigni-

ficant. The Obs* R squared showed weak statistical significance with the second order test. However, the inclusion of AR (1) and AR (2) in the estimation model turned statistically insignificant. Higher order ARs resulted in singular matrices for which the model could not be estimated.

Hence, the weak serial correlation is inconsistent with that of the F-statistic and this can be ignored. More importantly, the data is not a pure time series data for which serial correlation is a relevant issue.

The funnel plots (Figure 2) and model 1 and 2 suggest there is publication bias. The inclusion of other variables which explain differences in MO-performance coefficients (MOPE) have resulted in the disappearance of publication bias in model 3. This is confirmed by the statistical insignificance coefficient of SE, which represents publication bias. The constant, which measures the effect size, is 7.898 and statistically significant at 1% means that there is strong evidence of a positive relationship between market orientation and organizational performance.

Three of the MO measures are negative and statistically significant. The mixed measure is statistically insignificant. This implies that the excluded measure, Kohli et al (1993) produces a higher MO-performance relationship than all others. Recognizing the role of moderators in the primary studies increased the MO-performance relationship. The statistically insignificant moderator variable suggests that the excluded moderators; strategic consensus, strategic mission rigidity, risk-taking rewards and long-term rewards together increase the MO-performance effect. Sample size coefficient is statistically insignificant. This implies that

the size of the sample does not influence the MO-performance effect.

All coefficients representing the performance measures are statistically insignificant. This implies that choice of performance measure does not influence the MO-performance effect. The variable capturing studies in USA is negative and statistically significant, whilst that of Europe is statistically insignificant. This implies that in the excluded regions, namely Asia and Africa, the effect of MO-performance is higher than it is in the USA. The coefficients of variables capturing industry from which data were collected for primary studies showed statistical insignificance. This implies that there is no difference in MO-performance measures among industries. Regression coefficients reported in MO-performance studies are either standardized or unstandardized. The coefficient for the standardized variable is statistically insignificant, implying that statistically, there is no difference between these two types of measures.

Discussions and Managerial Implications

Our findings indicate the existence of publication bias when we examined the effect of market orientation on performance. This finding may be attributed to the likelihood of distortion of reported results of studies involving only two constructs due to publication pressures. This finding is in line with the economics-research-cycle hypothesis. However, when the analysis is extended to include other variables which are purported to explain the differences in the market orientation-performance relationship, there is an absence of publication bias. It is likely that

the inclusion of these additional variables introduces complexities into the model being examined and provides further room to investigate a host of factors that extend the life-span of the economic-research-cycle, thus limiting the effect of publication bias. It must be noted that publication bias is more a research issue than a managerial issue. Its disappearance with the inclusion of study characteristics implies that these factors need to be controlled for in order to reduce publication bias.

On the average, the impact of market orientation on performance is statistically significant and positive, lending credence to several research studies conducted either based on various countries performance measures which found a strong relationship between market orientation and performance. The works in different countries include Australia - Farrell (2000); USA - Kohli et al. (1993), Germany - Homburg and Pflesser, (2000); Taiwan - Horng and Chen (1998); the Netherlands - Langerak et al. (2004); Spain - Lado et al. (1998) among others. Studies using different performance measures include Appiah-Adu (1997) - new product success, sales growth and return on investment; Kirca et al. (2005) - overall performance; Gray et al. (1998) - return on investment, brand awareness, customer satisfaction and loyalty; among others.

Our market orientation-performance finding is also consistent with those of other meta-analytical researchers whose empirical work has been conducted over the last decade. These include the findings of: Rodriguez Cano et al. (2004); Shoham et al. (2005); Ellis (2006); Grinstein (2008); and Vieira (2010).

The fact that Kohli et al. (1993) measure of market orientation produces a stronger market orientation-performance link compared to the association between all other market orientation constructs and performance is worth commenting on. This finding could be attributed to the fact that Kohli et al.'s (1993) scale, with its emphasis on information generation, dissemination and utilisation, makes it possible for a firm to be more knowledgeable about its internal and external business environments than its rivals, and when this knowledge is used effectively and proactively, places the organisation in a stronger position to achieve superior performance relative to its competitors.

The statistically significant impact of moderator variables on the market orientation-performance relationship implies that businesses that aim to excel in the marketplace must be fully aware of the important role that the combined effect of moderators such as strategic consensus, strategic mission rigidity, risk-taking rewards and long-term rewards play in honing the impact of market orientation on performance. This finding does not only lend additional support to the results of the meta-analysis studies highlighted in the above section, but firmly reinforces earlier propositions by ground-breaking research into the market orientation-performance association that environmental factors do moderate the relationship (Jaworski and Kohli, 1993; Slater and Narver, 1994a).

From the findings, the suggestion is that acknowledging the roles of various moderators on the market orientation-performance link provides an organization with the opportunity to know which variables

of the business environment to focus on in order to excel in specific areas of business performance. This finding is consistent with those of various meta-analytical researchers who used different moderators. These include Rodriguez Cano et al. (2004) (moderators - business objective, industry type, socio-economic development, cultural dimension); Shoham et al. (2005) (moderators - geographical location, market orientation measure used; performance measure used); Ellis (2006) size and growth stage of markets, market orientation measure used); Grinstein (2008) (moderator - firm size); and, Vieira (2010) (moderators - performance measure, industry type, market orientation measure).

It is interesting to note that sample size does not influence the market orientation-performance effect. The inference from this finding is that the impact of a strong market orientation on performance is robust and once the appropriate analytical tools are used to determine the relationship between the two constructs, the finding tends to be universally consistent. The finding that sample size coefficient is statistically insignificant is quite surprising since one would have expected that studies with larger data sets would be likely to detect statistically significant results without much specification research and, therefore, exhibit less variability. Also there is the possibility that the sample sizes used are adequate; above the minimum required to produce robust results.

Another implication is that research on MO-performance can be cost effective by working within a sample size of 52 and 411 depending on the explanatory variable employed in the study. In the context of

meta-analytical findings that this research draws from, all the earlier work was based on large data sets, and reported significant positive relationships between market orientation and performance and if we are to limit our discussion to these particular studies, then there may be no further explanations to give for this finding. However, it must be noted that specific research based on individual countries has revealed that regardless of the sample size used, varying results have been obtained by different researchers in previous studies, lending support to our finding that on this particular subject, sample size may not really matter (Cadogan et al. 1999; Moorman, 1995).

Based on our findings, the statistical insignificance of the coefficients representing performance measures suggests that variation of performance measures does not influence the market orientation-performance statistic. This finding is supported by the key meta-analysis studies that this research draws from (Ellis, 2006; Grinstein, 2008; Rodriguez Cano, Carrillat and Jaramillo, 2004; Shoham, Rose and Kropp, 2005; Vieira, 2010). While Shoham, Rose and Kropp (2005) suggested that the impact of market orientation on subjective performance measures tended to be stronger than its impact on objective measures, combinations of the two captured the middle ground. Their argument is that subjective assessments may provide a better measurement of performance because managers integrate environmental conditions in their performance measures, and therefore, subjective assessments may offer a more appropriate measure compared to objective evaluations. A creative methodology to examine the variations is to adopt a

combination of performance measures and select the most germane performance measure for an organization in line with its strategic goals.

If the selection of performance measure does not influence the market orientation-performance relationship, then regardless of an organisation's performance objectives, the imperative to be strongly market oriented would not be a misplaced priority. Consequently, depending on its objective(s) in the marketplace, a firm can choose to focus on organisational commitment, organisational learning, customer orientation, innovation, financial performance or a combination of the aforementioned performance measures as long as such a strategy helps the firm to meet its overall goals and its market-oriented efforts are aligned to the business environment to enable it to achieve that particular performance objective.

The variable capturing empirical research into the market orientation-performance relationship in the USA is negative and statistically significant. The finding that in the excluded regions, specifically, Africa and Asia, the impact of market orientation on performance is stronger than it is in the USA is quite revealing and contradicts the findings of Ellis (2006), that the market orientation-performance effect is significantly stronger in the USA compared to other regions. This result is also inconsistent with Rodriguez Cano et al.'s (2004) finding that country context does not influence the market orientation-performance link. However, our finding is supported by Shoham et al. (2005) whose USA samples exhibited a relatively weaker association between market orientation and performance. This implies that in less

developed markets (Africa and Asia), market orientation efforts tend to make a relatively more significant impact. Therefore, marketers in Africa and Asia need to invest in market orientation as this has significant payoffs.

One would have expected that in a mature market like the USA, which is characterized by stable demand, intense competition, short channels and sophisticated buyers, higher levels of market orientation are required for better performance compared to emerging developing economies that are characterized by rapid growth and uncertain demand, thus, making market orientation less valuable. Moreover, since the two dominant market orientation measures were designed and validated within the context of a US business culture, it is suggested that modifying these measures for application in other countries may reduce the reliability of these instruments resulting in "noisier" market orientation measures and weaker correlations (Ellis, 2006).

A possible explanation for our finding of the need for stronger emphasis on market orientation in the emerging economies (Africa and Asia) is that marketing is now evolving as a critical variable that organisations have to pay attention to in growing markets, and all firms that aspire to survive or remain competitive need to execute marketing principles and operations effectively in order to be successful. It is plausible that market orientation may have a stronger impact in countries where consumer service and customer expectations are still evolving. In such nations, market orientation may permit an organization to gain a competitive edge by offering superior service levels than its rivals (Shoham

et al., 2005). This finding implies that the period when developing country firms could reap the benefits of marketing without necessarily being market oriented may be over and that managers in Africa and Asia would do well to invest their resources in market oriented activities. It is suggested that this orientation needs to involve a holistic marketing approach that takes into account the organization's management of the marketing mix, usefulness of its market research, suitability of its positioning strategies, and the nature of its marketing goals (Ellis, 2005; Fahy et al, 2000).

The statistical insignificance of the coefficients of variables capturing industry from which data was generated indicates that market orientation's influence traverses industries. The implication is that irrespective of the industry in which a firm operates, it is important for managers to take the execution of marketing practices effectively because the sound implementation of such practices tends to distinguish high performers from the rest of the competition. Our results are inconsistent with the findings of Gray and Hooley (2002) that, all things being equal, for the same level of market orientation, business performance is stronger for service than manufacturing organizations, since by the nature of their business, service firms maintain a strong relationship with customers (Kotler and Keller, 2011). Nevertheless, our finding corroborates the assertion that has been made over more than half a century by leading advocates of marketing, that effective marketing is cardinal to competitive success (McCarthy, 1960; Kotler, 2011). The managerial implication of our finding is that regardless of the industry in which a business operates,

it is important to be market oriented in order to achieve superior performance.

Conclusions and recommendations for future research

In this study we pick 38 estimates from 12 papers that concentrate on the market orientation–performance relationship using regression analysis. An examination of the literature on market orientation showed that a significant number of studies employed linear correlation analysis to study the market orientation–performance phenomenon hence the relatively small sample that studied the phenomenon using regression analysis. In addition, we undertake related studies of the effect of moderators on the market orientation–performance association by incorporating only those coefficients that scholars estimate in the same regression with the market orientation–performance link. We utilise contemporary meta-analysis techniques to determine the fundamental consequences of market orientation on organisational performance. The results show a strong and positive MO–performance relationship. As noted in the introduction, the sources of this bias suggest that authors, editors and reviewers should rely more on the rigor of the study rather than studies with 'desirable or expected results' as deviations from the norm informed by plausible explanations constitute advancement in knowledge. Despite the initial existence of publication bias, accounting for study characteristics eliminated the publication bias.

This research makes unique contributions to the literature in several ways. With respect to performance measures, our study uses overall performance, relative market share, new product performance and

several financial performance measures (return on assets, return on equity, return on investment, profit margin and sales growth) in order to strengthen the conclusions drawn from our findings in the light of existing knowledge.

Moreover, our research created four categorisations of performance, one more than the studies of Rodriguez Cano et al. (2004) and Shoham et al. (2005) did, and two more than that of Ellis (2006). Whilst Vieira (2010) used four disaggregated measures, this study employed more than seven disaggregated measures. This provided an opportunity to test the possible influence of the different performance measures. Furthermore, this study used the MO-performance measures as reported by the authors listed in Table 1. However, these were appropriately accounted for using a dummy variable. Correlation coefficients result from the relation of only two variables. However, several factors moderate performance and market orientation. Since regression analysis tends to control for some of the moderating factors, our study used only MO-performance regression coefficients.

Research in the area of market orientation has evolved over the years covering single firm studies, comparative industry studies within a nation, international comparative studies and global meta-analytic studies. Based on the most recent studies of meta-analytic trends, the approach has been to weight the effect size by the sample size, perform Z and/or Fisher transformation. These have relied on procedures recommended by Hedges and Oklin (1985), Bamberger et al. (1999) and Hunter and Schmidt (1990, 2004). In rare cases, regression analysis was performed relating

the mean effect size to categorical and continuous variables separately.

This study is the first market orientation-performance study to examine the subject of publication selection bias, effect size and specific study characteristics jointly. From our standpoint, the most critical area requiring further investigation in this arena is research into the use of market orientation-performance effect measures generated from correlation analysis as the dependent variable. This study indicates that there are significant variations in the market orientation-performance relationship examination across nations. When it is possible to determine the bases of these variations in detail, the findings may provide practitioners and policy makers with critical insights into how to obtain the greatest benefits from a sound market orientation at both the firm and national level.

Our conclusions are based on MO-performance regression coefficients. It is unknown if similar conclusions would be arrived at MO-performance using correlation coefficients. This will indeed be interesting as the effect size used in most of the meta-analysis studies we reviewed were correlation coefficients. It is also recommended that similar studies be conducted in specialized areas of marketing such as consumer behaviour, marketing communications, retail management, branding, sales management, interntional marketing, and other areas such as strategic management, organizational behaviour, human resource management, accounting, banking and finance in order to examine the universal applicability of our findings across the various fields of business and management.

Our inability to control for multiple observations from the same author to the metadata due to limitation of the size of the metadata offers an opportunity for further research with larger metadata set.

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APPENDIX - Table 1: List of Literature used as data set

No	Author/year	Estimate	Standard error	MO measure	Moderators/ Interactions	Sample	Performance measure	Degrees of freedom	Country	Industry	Standardization
1	Appiah-Adu & Singh (1998)	0.32	0.11	N&S	No	132	ROI	123	UK	Manufacturing	Standardized
2	Appiah-Adu & Singh (1998)	-0.74	0.319	N&S	Market growth	132	Sales growth	129	UK	Manufacturing	Standardized
3	Appiah-Adu & Ranchhod (1998)	0.34	0.12	N&S	No	62	Profit margins	52	UK	biotechnology	Standardized
4	Appiah-Adu & Ranchhod (1998)	0.37	0.18	N&S	No	62	Overall performance	52	UK	biotechnology	Standardized
5	Appiah-Adu & Ranchhod (1998)	0.42	0.23	N&S	No	110	Mkt share growth	52	UK	biotechnology	Standardized
6	Appiah-Adu (1998b)	0.30	0.14	Pelham & Wilson (1996)	Proactive MO	110	Sales growth	102	UK	Small business	Un-standardized
7	Appiah-Adu (1998b)	0.27	0.18	Pelham & Wilson (1996)	No	110	ROI	102	UK	Small business	Un-standardized
8	Atuahene-Gima et al (2005)	-0.22	0.089	Mixed	Proactive MO	142	New product performance	119	USA	Manufacturing	Standardized
9	Atuahene-Gima et al (2005)	0.20	0.082	Mixed	Strategic consensus	142	New product performance	119	USA	Manufacturing	Standardized
10	Atuahene-Gima et al (2005)	-0.27	0.085	Mixed	Marketing's power	142	New product performance	119	USA	Manufacturing	Standardized
11	Atuahene-Gima et al (2005)	-0.21	0.083	Mixed	Strategic mission rigidity	142	New product performance	119	USA	Manufacturing	Standardized
12	Atuahene-Gima et al (2005)	0.13	0.521	Mixed	Learning orientation	142	New product performance	119	USA	Manufacturing	Standardized
13	Atuahene-Gima et al (2005)	0.19	0.112	Mixed	Responsive MO	142	New product performance	117	USA	Manufacturing	Standardized
14	Atuahene-Gima et al (2005)	0.16	0.075	Mixed	No	142	New product performance	128	USA	Manufacturing	Standardized
15	Baker & Sinkula (1999)	-0.162	0.129	K et al (1993)	Learning Orientation	411	Overall	397	USA	Manufacturing	Standardized
16	Baker & Sinkula (1999)	0.266	0.130	K et al (1993)	None	411	Rel. mkt share	397	USA	Mixed	Un-standardized
17	Baker & Sinkula (1999)	0.240	0.140	K et al (1993)	None	411	Rel. mkt share	397	USA	Mixed	Un-standardized

No	Author/year	Estimate	Standard error	MO measure	Moderators/Interactions	Sample	Performance measure	Degrees of freedom	Country	Industry	Standardization
18	Baker & Sinkula (1999)	0.465	0.114	K et al (1993)	None	411	New product success	397	USA	Mixed	Un-standardized
19	Baker & Sinkula (1999)	-0.233	0.123	K et al (1993)	Learning Orientation	411	New product success	397	USA	Mixed	Un-standardized
20	Baker & Sinkula (1999)	0.355	0.119	K et al (1993)	None	411	Overall	397	USA	Mixed	Un-standardized
21	Bhuian (1997)	-0.13	0.1446	J&K	None	92	ROE	89	Saudi Arabia	Banking	Standardized
22	Bhuian (1997)	-0.15	0.1244	J&K	None	92	Sales/Employee ROA	89	Saudi Arabia	Banking	Standardized
23	Bhuian (1997)	-0.13	0.1446	J&K	None	92	ROA	89	Saudi Arabia	Banking	Standardized
24	Bhuian (1998)	0.65	0.1820	J&K	No	115	Overall	113	Saudi Arabia	Manufacturing	Standardized
25	Charles et al (2012)	0.106	0.048	N&S	No	147	Mixed	146	Kenya	Manufacturing	Un-standardized
26	Grewal and Tansuhaj (2001)	-0.734	0.356	J&K	CI, DU, TU	120	Satisfaction ROI, Sales, Profit, etc.	111	Thailand	Mixed	Un-standardized
27	Petit et al (1996)	5.9967	0.7652	K et al (1993)	No	193	Overall impression	192	Malta	Mixed	Un-standardized
28	Petit et al (1996)	6.32998	0.8935	K et al (1993)	No	161	Overall impression	160	Malta	Mixed	Un-standardized
29	Slater & Narver (1994)	0.91	0.19	N&S	No	107	Sales growth	97	USA	Mixed	Un-standardized
30	Slater & Narver (1994)	0.52	0.20	N&S	No	107	New product success	97	USA	Mixed	Un-standardized
31	Slater & Narver (1994)	-0.31	0.33	N&S	Market turbulence	107	ROA	97	USA	Mixed	Un-standardized
32	Slater & Narver (1994)	-0.22	0.32	N&S	Technological Turbulence	107	ROA	97	USA	Mixed	Un-standardized
33	Slater & Narver (1994)	0.38	0.42	N&S	Competitive Hostility	107	ROA	97	USA	Mixed	Standardized
34	Slater & Narver (1994)	-0.00	0.07	N&S	Market growth	107	ROA	97	USA	Mixed	Un-standardized
35	Slater & Narver (1994)	0.63	0.20	N&S	No	107	ROA	97	USA	Mixed	Un-standardized

No	Author/year	Estimate	Standard error	MO measure	Moderators/ Interactions	Sample	Performance measure	Degrees of freedom	Country	Industry	Standardization
37	Wei & Atuahene-Gima (2009)	0.23	0.09	J&K	Long-term rewards	110	New product performance	101	China	High-tech	Standardized
38	Wei & Atuahene-Gima (2009)	-0.18	0.09	J&K	Risk-taking rewards	110	New product performance	101	China	High-tech	Standardized