THE IMPACT OF GENDER DIVERSITY ON PERFORMANCE IN SERVICES AND MANUFACTURING ORGANIZATIONS

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ABSTRACT

We present three competing predictions of the organizational gender diversity-performance relationship: a positive linear prediction, a negative linear prediction, and an inverted U-shaped curvilinear prediction. The paper also proposes a moderating effect of industry type (services vs. manufacturing). The predictions were tested using archival quantitative data with a longitudinal design. The results show partial support for the positive linear and inverted U-shaped curvilinear predictions as well as for the proposed moderating effect of industry type. The results help reconcile the inconsistent findings of past research. The findings also show that industry context can strengthen or weaken gender diversity effects.
Workforce gender diversity is increasing in countries all over the world (International Labour Office, 2007). For example, women’s representation in the United States civilian labor force has increased from 29.4 percent in 1950 (U.S. Census Bureau, 1970) to 46.3 percent in 2006 (U.S. Bureau of Labor Statistics, 2007). Similarly, women’s representation in the Australian labor force has increased from 22.9 percent in 1954 (Commonwealth Bureau of Census and Statistics, 1958) to 46.1 percent in 2006 (Australian Bureau of Statistics, 2006).

The increase in workforce gender diversity has attracted the attention of both researchers and practitioners. In particular, a question arises whether the gender composition in an organization’s workforce will affect individual, group, or organizational level performance. In the early 1990s, both scholars and practitioners were generally optimistic about the effects of workforce diversity on performance. For example, Cox and Blake (1991) argued that diversity can be a source of competitive advantage. However, theories and empirical research thus far suggest that diversity can lead to either positive or negative outcomes. The resource-based view of the firm (Barney, 1991) suggests a positive diversity-performance relationship, whereas social identity theory (Tajfel, 1978) suggests a negative diversity-performance relationship. Further, empirical research has found inconsistent results suggesting that diversity can be either good or bad for businesses (for reviews, see Jackson, Joshi, & Erhardt, 2003; Svyantek & Bott, 2004).

For instance, Svyantek and Bott (2004) reviewed nine diversity studies (published during 1989-2003) that investigated the gender diversity-performance relationship. Out of the nine studies, four found no main effects, two found positive effects, two found negative effects, and one found a nonlinear effect.

The body of literature on diversity sends a confusing message to practitioners on whether gender diversity is good for businesses or not. The mixed evidence suggests the value of
focusing on competing predictions (Armstrong, Brodie, & Parsons, 2001), including nonlinear predictions (Richard, Kochan, & McMillan-Capehart, 2002), and of considering the effect of context on the diversity-performance relationship (Jackson et al., 2003). Competing predictions are useful when ‘prior knowledge leads to two or more reasonable explanations’ (Armstrong et al., 2001: 175). Moreover, Jackson et al. (2003) advised scholars to describe their studies’ contexts in detail to enable cross-study comparisons that might explain inconsistent results. Studying the moderating effect of context might help explain inconsistencies in past research and achieve a ‘more precise and specific understanding’ of the primary gender diversity-performance relationship (Rosenburg, 1968: 100).

This study aims to address inconsistent findings of past empirical research by testing competing predictions on the gender diversity-performance relationship at the organizational level with objective data. The study’s design addresses a critical gap in the literature – there is a dearth of gender diversity research at the organizational level (Frink et al., 2003; Jackson et al., 2003) that maintains the diversity-performance temporal sequence so that diversity’s effects on subsequent organizational performance can be rigorously assessed. This study also incorporates context by studying the moderating effect of industry type (Richard, Murthi, & Ismail, 2007) on the gender diversity-performance relationship, that is, the interaction effect of gender diversity and industry type on performance.

COMPETING PREDICTIONS

This paper presents three competing predictions of the gender diversity-performance relationship at the organizational level: a positive linear prediction based on the resource-based view of the firm, a negative linear prediction based on self-categorization and social identity theories, and an inverted U-shaped curvilinear prediction based on the integration of the
resource-based view of the firm with self-categorization and social identity theories (see Figure 1). We also argue that because of certain human resources related differences in the services and manufacturing industries, diversity can have different dynamics in the two industries. Therefore, we propose that the industry context (services vs. manufacturing) can affect the gender diversity-performance relationship (see Figure 1).

Positive Linear Prediction

The positive linear gender diversity-performance relationship can be derived from the resource-based view of the firm. According to the resource-based view, a firm can gain a sustained competitive advantage if it takes advantage of its valuable, rare, inimitable, and non-substitutable resources (Barney, 1991). Barney (2001) noted that past empirical research on the resource-based view of the firm suggests that intangible and socially complex resources such as employee competence are a better source of sustained competitive advantage than tangible resources such as scale of operations.

This research proposes that organizational gender diversity is a source of intangible and socially complex resources that can provide a firm with a sustained competitive advantage. The intangible and socially complex resources derived from gender diversity include market insight, creativity and innovation, and improved problem-solving (McMahan, Bell, & Virick, 1998). Men’s and women’s different experiences (Nkomo & Cox, 1996) may provide insights into the different needs of male and female customers. Further, gender diversity may enhance employees’ overall creativity and innovation because of the combination of different skills, perspectives and backgrounds (Egan, 2005). In addition, a gender-diverse workforce can produce high quality decisions because men and women bring different perspectives leading to varied alternatives.
(Rogelberg & Rumery, 1996). These varied alternatives are then evaluated from different angles, leading to a better understanding of their impact on both soft and hard measures of organizational performance such as corporate reputation and financial performance (Campbell & Mínguez-Vera, 2008).

The resources of market insight, creativity and innovation, and improved problem-solving are valuable, rare, inimitable, and non-substitutable. They are valuable, because they drive business growth (Robinson & Dechant, 1997). They may also be considered rare. For instance, creative ideas that can lead to competitive strategies are rare (Oetinger, 2001). These resources cannot be easily accessed or copied by homogeneous organizations (Frink et al., 2003). Therefore, they are largely inimitable. There are no readily-available substitutes for these resources. In sum, organizational gender diversity is associated with intangible and socially complex resources that can provide a firm with a sustained competitive advantage. This competitive advantage should lead to higher organizational performance (Grant, 1991).

Empirical research supports the argument that organizational gender diversity is positively linked to an organization’s performance. McMillan-Capehart (2003) used the resource-based view of the firm to argue that gender and racial diversity at the management and organizational levels can provide a firm with a competitive advantage. The study’s results found a positive relationship between organizational gender diversity and performance when performance was operationalized as return on equity. Further, Frink et al. (2003) conducted two organizational level empirical studies to examine the relationship between women’s representation and performance, measuring performance differently in each study. The overall results supported the authors’ argument that an organization’s performance would be greatest when gender diversity is maximized (50 percent women’s representation). Thus, it is proposed:
Hypothesis 1a: Organizational gender diversity will be positively related to organizational performance.

**Negative Linear Prediction**

The negative linear gender diversity-performance relationship is based on self-categorization and social identity theories. Self-categorization theory suggests that people categorize themselves into various social and psychological identity groups such as intellectual, engineer, male, white, or Australian (Turner *et al.*, 1987). The categories available for self-categorization operate at multiple levels (Haslam, Powell, & Turner, 2000). The narrowest level of category relates to an individual’s self-identity and wider group level categories create the individual’s social identity, in which the individual shares his or her self-identity with other group members (in-group) but not with non-members (out-group). For instance, a categorization based on sex would result in a person developing a psychological association with either the male social group or the female one.

Categorization based on visible differences such as race, gender, or age is especially common (Messick & Mackie, 1989). Therefore, a gender-diverse workforce may produce psychological groups comprised of male group-members and female group-members. People like to perceive their social identity positively (Tajfel & Turner, 1986), and the tendency to see one’s own group as better than other groups promotes psychological division and social comparison between an in-group and an out-group. Therefore, social comparison between male and female psychological groups can trigger inter-group dynamics and tensions. As a result, gender diversity may produce negative behavior such as decreased communication (Kravitz, 2003), stereotype-based role expectations (Elsass & Graves, 1997), a lack of cohesion (Triandis,
and cooperation (Chatman & Flynn, 2001), and increased conflict (Pelled, 1996) among employees.

Empirical research supports the argument that gender diversity produces the negative dynamics predicted by self-categorization and social identity theories. For instance, based on social identity theory, Jehn, Northcraft, & Neale (1999) argued that workgroup social diversity in the form of sex and age would be positively related to relationship conflict. The authors studied 92 workgroups from a household goods moving firm in the United States. The results suggested a positive association between workgroup social diversity and the relationship conflict experienced by group members. Similarly, Alagna, Reddy, and Collins (1982) found that students in mixed sex groups, compared to students in all male groups, reported more communication problems, greater unresolved interpersonal conflicts, more difficulty working together, more frequent changes in group membership, lower perceived cooperation, and higher perceived tension.

If a high degree of gender diversity at the organizational level is reflected in gender-diverse workgroups then in-group out-group dynamics may result. These in-group out-group dynamics may lead to more relationship conflict (Jehn et al., 1999), more communication problems and difficulty in working together (Alagna et al., 1982), and lower task cohesion (Shapcott et al., 2006) than would occur in less gender-diverse workgroups. Moreover, these negative effects, suggested by social identity theory, should result in low individual and group performance (Richard et al., 2003). Consequently, low individual and group performance may aggregate to low organizational performance. Thus, it is proposed:

Hypothesis 1b: Organizational gender diversity will be negatively related to organizational performance.
Inverted U-shaped Curvilinear Prediction

The positive and negative competing predictions describe linear relationships between gender diversity and performance. The positive linear prediction derived from the resource-based view of the firm suggests that more diversity (high proportions of both genders) is better than less. In contrast, the negative linear prediction derived from self-categorization and social identity theories suggests that less diversity (high proportion of one gender) is better. The inverted U-shaped relationship (∩) is derived from the integration of these two predictions, that is, the integration of the resource-based view of the firm with self-categorization and social identity theories. The integration of these theories means that different ranges of gender diversity (e.g., low to moderate levels of gender diversity) are associated with different dynamics explained by one or the other theory (e.g., Richard et al., 2002; Richard et al., 2007).

Kanter (1977) categorizes gender-diverse groups based on the range of different proportions of men and women. These different levels of gender diversity can have different impacts on performance. A gender homogeneous or uniform workgroup (0/100 gender proportions) lacks the resources of market insight, creativity and innovation, and improved problem-solving that the resource-based view of the firm suggests gender diversity could provide, resulting in low group performance. As gender diversity reaches a low level (5/95 to 15/85 gender proportions), it results in a skewed group, for example, one woman and seven men in a group of eight employees. There is a negative relationship between the size of the minority group and the amount of intergroup contact (Blau 1977), so the token woman will have frequent contact with the male group members. Moreover, the token woman will receive social support from the male group members (South et al., 1982). The frequent contact between the male and female group members may begin to produce the benefits of diversity derived from the resource-
based view of the firm such as market insight, creativity and innovation, and improved problem-solving. Therefore, the positive effects of diversity will benefit skewed groups. For instance, Rogelberg and Rumery (1996) found that teams including a single female member outperformed all-male teams.

The benefits of diversity continue to positively affect group performance from low levels of gender diversity (5/95 to 15/85 gender proportions) to a moderate level of gender diversity (20/80 to 35/65 gender proportions). For example, Knouse and Dansby (1999) found that 11-30% diversity levels (percent representation) were optimal in the relationship between each measure of group diversity (age and racial diversity) and perceived group effectiveness. However, increases in gender diversity beyond the optimal level may shift the net effect of gender diversity such that the negative effects of diversity predicted by self-categorization and social identity theories overcome the positive effects of diversity derived from the resource-based view of the firm. The members of such a group (tilted groups: for example, three women and five men in a group of eight employees) may begin to categorize themselves into the psychological groups of male group-members and female group-members (Kanter, 1977). This psychological categorization generates the intergroup dynamics that, in turn, produce undesirable employee behavior such as decreased communication (Kravitz, 2003) and increased conflict (Pelled, 1996). For instance, the increased representation of women would lead to reduced inter-group contact (between the male and female psychological groups) and increased intra-group contact (within the male and female psychological groups) (Blau, 1977). Therefore, organizations with moderate levels of diversity may experience dynamics that enable the negative effects of diversity more than the positive effects. For instance, Knouse and Dansby
(1999) found that minority proportions (proportions of members who differed from the group in age or race) exceeding 30 percent led to lower perceived group effectiveness.

At even higher levels of gender diversity (40/60 to 50/50 gender proportions), the unit would divide into male and female psychological groups of similar size. The negative effects of diversity continue to adversely affect employees and even intensify. The increasing minority representation (e.g., women) may be seen as a power threat by the majority (e.g., men) (Allport, 1954; Blalock, 1967), leading to increased perceived economic competition (Blalock, 1967) and increased intergroup conflict (Williams, 1947). Blalock suggested that ‘one would expect the greatest perceived competition among near-equals’ (1967: 148). The increased competition and conflict would intensify in-group out-group dynamics further lowering performance.

The aggregated workgroup gender diversity-performance effects may result in an inverted U-shaped organizational gender diversity-performance relationship (Richard et al., 2002) if the different levels of gender diversity in organizations are reflected in corresponding levels of gender-diverse workgroups. This means that a homogeneous and a gender balanced workforce are both associated with low performance, whereas a tilted workforce is associated with high performance. Thus it is proposed:

Hypothesis 1c: Organizational gender diversity will have an inverted U-shaped relationship with organizational performance.

Moderating Effect of Industry Type

The theories used in the previous sections of this paper do not take into account contingencies that might change the strength of the gender diversity-performance relationship (Galbraith, 1973). One contingency is accounted for in this study by proposing the contextual variable of industry type (services vs. manufacturing) as a moderator.
Jackson and Schuler defined industry as ‘a distinct group of productive or profit-making enterprises’ (1995: 251). The most fundamental differences in the nature of business lie between firms in the services industry and firms in the manufacturing industry (Jackson, Schuler, & Rivero, 1989). Service firms are characterized by more involvement of customers in production and delivery processes, and a closer connection between production and consumption, than in manufacturing firms (Bowen & Schneider, 1988). Differences between the two industries can affect various aspects of organizations including their human resource practices (Jackson & Schuler, 1995). For instance, the relative separation of operations in manufacturing firms results in manufacturing employees performing their jobs more independently than services employees (Dean & Snell, 1991). Because of the differences between the manufacturing and services industries, the dynamics of organizational gender diversity may differ between organizations operating in the two industries.

Diversity can be a source of market insight, creativity and innovation, and improved problem-solving (Cox & Blake, 1991; McMahan et al., 1998). These resources can provide a firm with a competitive advantage if they are valuable, rare, inimitable, and non-substitutable (Barney, 1991). However, the value of these resources varies in firms across industries and so does their ability to provide a competitive advantage. For instance, in comparison to manufacturing firms, market insight is more important in services firms, because service-marketing requires cultural knowledge of the target segment (Richard, 2000). As a gender-diverse workforce can provide insight into the needs of male as well as female customers, gender diversity may have more potential for providing a sustained competitive advantage to firms in the services industry compared to firms in the manufacturing industry. In sum, the positive
effects of gender diversity predicted by the resource-based view of the firm may be stronger in the services industry than in the manufacturing industry.

Operations in manufacturing firms are relatively isolated from each other compared to those in services firms (Bowen & Schneider, 1988; Kulonda & Moates, 1986). As a result, employees in manufacturing firms have relatively low job interdependence (Dean & Snell, 1991) and less interaction (Frink et al., 2003). Supervisory styles in manufacturing firms tend to further isolate employees from one another. For example, Kulonda and Moates (1986) noted that only 39.8 percent of manufacturing supervisors conduct group meetings in their departments compared to 54.1 percent of services supervisors. Therefore, manufacturing employees belonging to different social identities do not get frequent opportunities to interact (Frink et al., 2003). The less interaction between male and female employees in manufacturing firms may exacerbate the intensity of inter-group dynamics (Allport, 1954). Consequently, the negative effects predicted by self-categorization and social identity theories may be stronger in manufacturing firms than in services firms.

In sum, industry type may affect the strength of the relationship between gender diversity and performance. Specifically, the positive effects of gender diversity will be stronger for firms in the services industry and the negative effects of gender diversity will be stronger for firms in the manufacturing industry. Thus it is proposed:

_Hypothesis 2: Industry type moderates the gender diversity-performance relationship such that the positive effects of gender diversity are stronger for firms in the services industry and the negative effects of gender diversity are stronger for firms in the manufacturing industry._
METHODS

The objective of examining the impact of gender diversity on organizational performance implies that gender diversity precedes performance. As a result, a longitudinal research design was used to test competing theories. The data points are on both sides of the starting date of data collection (October 2006) (see Figure 2), representing a combination of prospective and retrospective longitudinal research designs (Huselid, 1995; Wright et al., 2005). This study uses archival data from Australia’s Equal Opportunity for Women in the Workplace Agency (EOWA) database, the FinAnalysis database, the Datalink database, and the Business Who’s Who of Australia database.

Sample and Data Collection

The population of this research comprises all for-profit organizations of all sizes across industries in Australia. The research samples 1855 organizations that were listed on the Australian Securities Exchange (ASX) in the year 2006 and were operating in Australia. The study focuses on ASX-listed organizations because of the availability of archival data on the performance of listed organizations. The data on organizational gender diversity of 213 listed organizations for the year 2002, and 209 listed organizations for the year 2005 (with an overlap of 155 organizations), were obtained from the EOWA database. This is the full set of listed organizations that have annual equal opportunity reports available for 2002 and 2005 in the EOWA database (online data go back only to 2001, with data available for fewer ASX-listed organizations in 2001 than in later years). Organization size ranged from 45 employees to 162,432 for the year 2002 (mean 3,378), and from 73 to 183,897 for the year 2005 (mean 3,473). Women’s representation in these organizations ranged from 1% to 99% (mean 36%) for the year
2002, and 5% to 99% (mean 38%) for the year 2005. The organizations were drawn from nine out of ten industry groups; no organization belonged to the Nonclassifiable Establishments category. In 2002, the best represented industries were Manufacturing (30% of the organizations), Services (18%) and Finance, Insurance and Real Estate (13%). In 2005, the best represented industries were again Manufacturing (25%), Services (21%) and Finance, Insurance and Real Estate (15%).

For each organization, 2002 and 2005 data on gender diversity were matched to 2007 organizational performance data on employee productivity and return on equity (see solid lines in Figure 2). This matching resulted in time lags of two and five years between gender diversity and performance. Employee productivity was calculated using data obtained from the FinAnalysis and Datalink databases. Return on equity was obtained from the FinAnalysis database. Data on industry type were obtained from the Business Who’s Who of Australia database, which uses the U.S. based Standard Industrial Classification (SIC) codes to categorize organizations into 10 major industry groups. In addition, employee productivity and return on equity for the years 2001 and 2004 were used to control for past organizational performance and to test for reverse causality (see dotted lines in Figure 2). Data on three additional control variables were obtained as follows: organization size from the EOWA database, and organization age and organization type (holding or subsidiary/stand-alone) from the Business Who’s Who of Australia database.

Measures

**Outcome.** Organizational performance was measured using an intermediate performance measure of employee productivity and a financial performance measure of return on equity (e.g., Dwyer, Richard, & Chadwick, 2003). Employee productivity was calculated as the natural
logarithm of operating revenue (obtained from the FinAnalysis database) divided by number of employees (obtained from the Datalink database) (Huselid, 1995). Return on equity was obtained from the FinAnalysis database. FinAnalysis calculates return on equity as net profit after tax (before abnormals) divided by shareholders equity minus outside equity interests.

**Predictor.** Blau’s index of heterogeneity for categorical variables was used to calculate organizational gender diversity, based on gender proportions (Blau, 1977). Using Blau’s index, heterogeneity equals 1- \( \sum p_i^2 \), where \( p_i \) represents the fractions of the population in each group. Blau’s index of heterogeneity is based on a ratio or continuous scale (Buckingham & Saunders, 2004), so the index increases as the representation of men and women in the organization becomes more equal (Blau, 1977). For gender diversity, the index ranges from zero representing homogeneity (0/100 gender proportions) to 0.5 representing maximum gender diversity (50/50 gender proportions).

**Moderator.** The nine SIC industry groups of the sample organizations were categorized into manufacturing and services to test our argument that different contexts in the two industry categories lead to gender diversity producing stronger positive effects in services firms because of high interaction with customers, and stronger negative effects in manufacturing firms because of low interaction among employees. ‘Transportation, Communications, Electric, Gas and Sanitary Services,’ ‘Wholesale Trade,’ ‘Retail Trade,’ ‘Finance, Insurance and Real Estate,’ and ‘Services’ made up the services category (Richard et al., 2007). ‘Agriculture, Forestry and Fishing,’ ‘Mining,’ ‘Construction,’ and ‘Manufacturing’ made up the manufacturing category (Richard et al., 2007). A dummy variable called ‘industry type’ was created with ‘1’ representing manufacturing and ‘0’ representing services.
**Controls.** The analyses control for the effects of organization size, age and type on performance. Because of the economies of scale, large organizations have more potential to make large profits. Organization size was operationalized as the total number of employees (Huselid, 1995). Organization age may have an impact on performance. Compared to old firms, new firms with less formalized structures may be better positioned to capitalize on the benefits of gender diversity such as creativity and innovation. Organization age was operationalized as the number of years since the organization was founded (Richard et al., 2003). Organizations that are holding companies or subsidiaries, compared to stand-alone organizations, may benefit from the combined financial resources and economies of scale (Richard et al., 2003). A dummy variable called ‘organization type’ was created with ‘1’ representing ‘holding or subsidiary’ and ‘0’ representing ‘stand-alone’.

The analyses also controlled for the variance in later organizational performance that can be accounted for by earlier organizational performance. Firms that perform better have more resources to spend on training and employee development programs than their low performing counterparts. These investments can improve the future performance of such firms. Therefore, the study included controls for employee productivity and return on equity for the years 2001 (for analyses involving gender diversity in 2002) and 2004 (for analyses involving gender diversity in 2005). Because gender proportions and their effect on performance can vary across industries (Frink et al., 2003), industry type was also controlled for in the analyses of the main effects.

**RESULTS**

Table 1 presents the means, standard deviations, and correlation coefficients for all variables.
We used hierarchical multiple regression to test the hypotheses. The predictor variables of gender diversity 2002 and gender diversity 2005 were centered to reduce multicollinearity with polynomial and interaction terms. Hypothesis 1a proposed that organizational gender diversity would be positively related to organizational performance, whereas Hypothesis 1b proposed that organizational gender diversity would be negatively related to organizational performance. To test Hypotheses 1a and 1b for the outcome variable of employee productivity 2007, employee productivity 2007 was regressed separately on each predictor (gender diversity 2002 and gender diversity 2005), after the relevant control variables including industry type were entered in step 1. The results partially supported Hypothesis 1a, because gender diversity 2002 had a significant positive effect (b = 2.52, \( p < .05 \)) on employee productivity 2007. Gender diversity 2005 did not have a significant effect (b = 0.23, n.s.) on employee productivity 2007. There was no support for competing Hypothesis 1b.

Hypothesis 1c proposed an inverted U-shaped curvilinear relationship between organizational gender diversity and performance. To test Hypothesis 1c, a polynomial term of gender diversity 2002\(^2\) or gender diversity 2005\(^2\) was entered in step 3 (depending on the year under focus), after the relevant control variables including industry type were entered in step 1 and gender diversity 2002 or gender diversity 2005 was entered in step 2 (depending on the year under focus). The polynomial terms reflect the curvilinearity of the gender diversity-performance relationship. The results shown under Model 3 (for gender diversity 2002 predicting employee productivity 2007) in Table 2 indicate that gender diversity 2002\(^2\) had a significant effect (b = -20.10, \( p < .05 \)) on employee productivity 2007. The negative sign of the coefficient for gender
diversity 2002 indicates that there was an inverted U-shaped relationship between gender diversity 2002 and employee productivity 2007 (see Figure 3). The inverted U-shaped curvilinear gender diversity-employee productivity relationship was strongly positive (log of employee productivity increased from 10.23 to 13.17) at low to moderate levels of gender diversity (Blau’s index 0 to 0.40). The relationship was weakly negative (log of employee productivity decreased from 13.17 to 12.90) at moderate to high levels of gender diversity (Blau’s index 0.40 to 0.50). Figure 3 also displays the positive linear effect for comparison purposes (b = 2.52, p < .05). Hypothesis 1c was supported for gender diversity 2002 and employee productivity 2007. Moreover, the results shown under Model 3 for gender diversity 2005 predicting employee productivity 2007 in Table 2 indicate that gender diversity 2005 did not have a significant effect (b = -7.20, n.s.) on employee productivity 2007. Therefore, Hypothesis 1c was not supported for gender diversity 2005 and employee productivity 2007.

A similar procedure was adopted to test Hypotheses 1a, 1b and 1c for the outcome variable of return on equity 2007 (see Table 3). The results presented under Model 2 for gender diversity 2002 predicting return on equity 2007 did not support Hypotheses 1a or 1b, because gender diversity 2002 did not have a significant impact (b = -56.05, n.s.) on return on equity 2007. Similarly, results presented under Model 2 for gender diversity 2005 predicting employee productivity 2007 indicate that gender diversity 2005 did not have a significant effect (b = 15.41, n.s.) on return on equity 2007. Therefore, Hypotheses 1a and 1b were also not supported for gender diversity 2005 and return on equity 2007. Further, gender diversity 2002 and gender diversity 2005 were not significant in the two analyses (2002 b = -178.95, n.s.; 2005 b = -6657.13, n.s.). As a result, Hypothesis 1c was also not supported for either relationship: gender
diversity 2002 and return on equity 2007, and gender diversity 2005 and return on equity 2007. In sum, there was partial support for Hypotheses 1a and 1c (support with respect to employee productivity but not return on equity) and no support for Hypothesis 1b (no support with respect to either outcome).

Insert Table 3 about here

Hypothesis 2 proposed that the positive effects of gender diversity are stronger in services firms and the negative effects of gender diversity are stronger in manufacturing firms. This hypothesis involves a linear moderating effect (industry type) on a curvilinear relationship (between gender diversity and performance). A curvilinear by linear interaction term (e.g., gender diversity$^2 \times$industry type) accurately assesses a moderator effect on a curvilinear relationship only when the linear by linear interaction term is simultaneously included in the equation (Cohen et al., 2003). Therefore, we included two interaction terms in the regression equations: the linear by linear interaction term of gender diversity$\times$industry type, and the curvilinear by linear interaction term of gender diversity$^2 \times$industry type. Specifically, to test Hypothesis 2 for employee productivity 2007, interaction terms of gender diversity 2002$\times$industry type or gender diversity 2005$\times$industry type, and gender diversity 2002$^2 \times$industry type or gender diversity 2005$^2 \times$industry type were entered in step 4 (depending on the year under focus), after the relevant control variables and industry type were entered in step 1, gender diversity 2002 or gender diversity 2005 was entered in step 2 (depending on the year under focus), and gender diversity 2002$^2$ or gender diversity 2005$^2$ was entered in step 3. The results for gender diversity 2002 predicting employee productivity 2007 shown under Model 4 in Table 2 indicate that the interaction terms accounted for an additional four percent of variance in employee productivity 2007, with gender diversity 2002$^2 \times$industry type significant (b = 34.29, $p$
<.05). However, the interaction term of gender diversity 2005²×industry type was not significant (b = -10.08, n.s.) for gender diversity 2005 and employee productivity 2007.

We plotted the effects of different levels of organizational gender diversity in the two industries, as seen in Figure 4. Industry type moderated the strength of the inverted U-shaped curvilinear gender diversity-employee productivity relationship (with a strongly positive relationship at low and moderate levels of diversity and a weakly negative relationship at high levels of diversity). At moderate to high levels of gender diversity (Blau’s index 0.40 to 0.50), there is little difference in the effects of gender diversity in the two industries. However, at low to moderate levels of gender diversity (Blau’s index 0 to 0.40), increasing gender diversity has a more pronounced effect on employee productivity in the services industry (log of employee productivity increased from 7.35 to 13.22) than in the manufacturing industry (log of employee productivity increased from 12.56 to 13.09), as proposed in Hypothesis 2. Therefore, Hypothesis 2 was partially supported for gender diversity 2002 and employee productivity 2007.

A similar procedure was adopted to test Hypothesis 3 for the outcome variable of return on equity 2007. As can be seen in the Model 4 columns in Table 3, the interaction terms of gender diversity 2002²×industry type and gender diversity 2005²×industry type were not significant (2002 b = -724.71, n.s.; 2005 b = 14364.38, n.s.). As a result, Hypothesis 2 was not supported for gender diversity 2002 and return on equity 2007, and gender diversity 2005 and return on equity 2007. In sum, there was partial support for Hypothesis 2 (support with respect to employee productivity but not return on equity).
DISCUSSION

The main objective of testing three competing gender diversity-performance predictions (a positive linear, a negative linear, and an inverted U-shaped curvilinear) was to address inconsistent results of past diversity research. The narrow focus of past organizational gender diversity research on either a positive or a negative linear diversity-performance relationship might have generated conflicting findings. Moreover, the research sought to examine the gender diversity-performance relationship in the context of industry type (services vs. manufacturing). This study provides evidence of a positive linear gender diversity-performance relationship, an inverted U-shaped curvilinear gender diversity-performance relationship, and a moderating effect of industry type on the curvilinear gender diversity-performance relationship.

Linear Gender Diversity-Performance Relationship

The results indicate that there was an overall positive linear relationship between gender diversity and employee productivity (see Figure 3). With every five point increase in workforce gender diversity (e.g., from 0.05 to 0.10 on Blau’s index), employee productivity increased by an average of $38,824 annual operating revenue per employee, keeping all other variables studied at their mean values. Thus, this study adds to a growing body of diversity literature supporting the ‘business case’ for workforce gender diversity (e.g., Frink et al., 2003; McMillan-Capehart, 2003).

The positive relationship between organizational gender diversity and employee productivity supports the resource-based view of the firm (Barney, 1991). The results also strengthen the arguments that ‘intangible resources are the primary source of sustainable competitive advantage’ because most tangible resources can be imitated by the competitors (Hitt & Hoskisson, 1998: 12). Further, this study’s results support the arguments implied in the
resource-based view of the firm that a resource should precede performance (Barney & Mackey, 2005) allowing the resource enough time to affect performance. The positive effects of gender diversity were found only when there was a time lag of five years between diversity and employee productivity (e.g., Richard et al., 2007); no benefits were observed with a time lag of two years (e.g., Leonard, Levine, & Joshi, 2004). The findings suggest that the resources of market insight, creativity and innovation, and improved problem solving associated with organizational gender diversity take five years to affect the intermediate performance measure of employee productivity. Moreover, the results demonstrate the benefits of diversity derived from the resource-based view of the firm are more likely to affect more immediate performance measures (Barney & Mackey, 2005; Ray, Barney, & Muhanna, 2004). In our study, gender diversity accounted for variance only in employee productivity (an intermediate/process performance measure) and not in return on equity (a more distal financial performance measure).

**Curvilinear Gender Diversity-Performance Relationship**

We also found an inverted U-shaped relationship between organizational gender diversity and employee productivity when the time lag was five years (see Figure 3). The polynomial term, gender diversity$^2$, provides insight into the effects of gender diversity on performance at different levels of diversity. The diversity-performance relationship was positive at low and moderate values of gender diversity; the relationship leveled off at a moderate level of gender diversity (Blau’s index 0.40, equivalent to 28/72 gender proportions) and then became negative at high values of gender diversity. The positive part of the performance curve was steeper (log of employee productivity increased from 10.23 to 13.17) than the negative part of the curve (log of employee productivity decreased from 13.17 to 12.90). This dominant positive relationship is
reflected in the positive and significant gender diversity term when the polynomial term is not included in the regression equations predicting performance.

The inverted U-shaped gender diversity-performance relationship supports the integration of the resource-based view of the firm (Barney, 1999) with self-categorization and social identity theories (Tajfel, 1978; Turner et al., 1987). By combining a strong theoretical framework with a rigorous test of the curvilinear effect, we are able to identify the ‘tipping point’ (Blau’s index 0.40 equivalent to 28/72 gender proportions) beyond which the negative psychological effects of gender diversity predicted by self-categorization and social identity theories overcome the positive effects of gender diversity predicted by the resource-based view of the firm. The tipping point of 28/72 converges with those found in other studies (e.g., Knouse & Dansby, 1999). As the two psychological groups of male group-members and female group-members approach equal proportions, the social competition and negative group behaviors predicted by self-categorization and social identity theories intensify (Blalock, 1967). However, the negative relationship observed between 28/72 and 50/50 proportions is less substantial than the positive relationship observed from 0/100 to 28/72.

We used self-categorization and social identity theories to derive our predictions about negative effects of gender diversity on organizational performance. But in contrast to studies finding significant negative effects of gender diversity at the group level (e.g., Alagna et al., 1982; Jehn et al., 1999; Shapcott et al., 2006), we found relatively weak negative effects of gender diversity at the organizational level. These different results suggest several possible constraints on the applicability of self-categorization and social identity theories to the organizational level of analysis. First, the negative effects of gender diversity (e.g., conflict, lack of cohesion) predicted by these theories may be most relevant at the group level (Triandis et al.,
1994; Pelled, 1996). At the organizational level, dynamics such as market insight and employee-customer interaction may be more critical drivers of gender diversity effects (Cox & Blake, 1991). Second, these theories may only predict negative organizational effects when there is a direct correspondence between workforce gender diversity and workgroup gender diversity. In many organizations, men and women are segregated into separate occupations and job roles (International Labour Office, 2007; McMahan et al., 1998). In organizations with high levels of gender segregation, the negative group-level processes predicted by self-categorization and social identity theories are less likely to occur, and so we will observe weak negative effects on organizational performance even if the organization has a very gender diverse workforce.

**Moderating Effect of Industry Type**

The results indicate that industry type moderated the inverted U-shaped relationship between gender diversity and employee productivity. The positive part of the performance curve was steeper in the services industry (log of employee productivity increased from 7.35 to 13.22) than in the manufacturing industry (log of employee productivity increased from 12.56 to 13.09) (see Figure 4). This study’s results support organizational contingency theories (Galbraith, 1973), and our arguments that the services industry is best positioned to capitalize on the benefits of gender diversity because of the greater value of market insight, greater interaction among employees, and greater interaction between employees and customers in services organizations than in manufacturing organizations (Bowen & Schneider, 1988; Jackson et al., 1989). The negative effects of gender diversity were less marked and almost identical in the two industries.

Overall, gender diversity had very little impact on performance in manufacturing organizations. Performance in manufacturing organizations was uniformly high, ranging only from 12.56 log of employee productivity at 0/100 gender proportions to 13.00 log of employee
productivity at 50/50 gender proportions. Manufacturing firms tend to focus on tangible resources such as advanced manufacturing technology rather than on intangible resources such as customer understanding, creativity and innovation (Campbell & Mínguez-Vera, 2008). Unfortunately, these tangible resources can be easily imitated (Hitt & Hoskisson, 1998), making them a poor source of competitive advantage (Barney, 2001). Advanced manufacturing technology facilitates high production with fewer employees and can be readily adopted by competing firms, maintaining standard levels of employee productivity within the industry.

**Theoretical Implications**

The current study’s results have several theoretical implications that suggest some interesting directions for future research. First, the results support the value of integrating theories to understand the effects of gender diversity. Based on an integration of the resource-based view of the firm with self-categorization and social identity theories, we anticipated an inverted U-shaped relationship between gender diversity and organizational performance (e.g., Richard et al., 2002). In particular, we expected the most negative effects of diversity to be observed in organizations displaying high levels of gender diversity. In contrast, theories can be integrated to propose a U-shaped curvilinear diversity-performance relationship (Richard et al., 2007). We encourage researchers to continue to integrate theories to examine alternative nonlinear diversity-performance relationships and to include direct measures of the group behaviors (e.g., communication and conflict) that self-categorization and social identity theories position as mediators in those relationships.

Second, this study’s focus on both linear and curvilinear predictions provides a clearer understanding of the form of the gender diversity-performance relationship. Cohen et al. explained that the focus on a linear relationship is like ‘forcing this constant regression of Y on
X across the range of X’ (2003: 194). Such focus captures the overall increase or decrease in Y at different values of X and does not account for the change in the X-Y relationship as X increases. For instance, this study’s results show that the overall relationship between gender diversity and employee productivity (with a time lag of five years) was positive when a constant regression of employee productivity was forced on gender diversity across the range of gender diversity (see Figure 3). However, when a polynomial term of gender diversity$^2$ was introduced in the equation, the regression results indicated a significant inverted U-shaped relationship (see Figure 3). The curvilinear relationship qualified (positive at most levels of gender diversity), complemented (negative at high levels of gender diversity), and refined (gradual increase in performance at low and moderate levels of gender diversity) the positive linear relationship between gender diversity and employee productivity. A linear regression line overstated the benefits of diversity at low and high levels of gender diversity and understated the benefits of diversity at moderate levels of gender diversity. Therefore, the results suggest that scholars should test a curvilinear relationship even when their analyses reveal a significant linear relationship.

Third, this study tested and found support for the differential impact of gender diversity on the organizational performance of services and manufacturing firms that diversity theories do not yet explain. The results show that the positive effects of gender diversity changed as a function of industry type. Similarly, Richard et al. (2007) found a differential impact of racial diversity on performance in the two industries. The moderating effects found in Richard et al.’s and our studies highlight the value of taking a contingency approach to researching the effect of diversity on performance, with the aim of building theories that can explain the different impact of diversity in the two industries.
Practical Implications

This study provides managers with some useful insights into the impact of gender diversity on performance in the context of industry type. For instance, the research demonstrates that managers cannot expect to see immediate benefits of focusing on gender diversity. Managers may feel disillusioned when their organizations fail to realize the anticipated benefits of increased workforce gender diversity (e.g., Kochan et al., 2003). The results show that managers may need to ‘grow’ gender diversity substantially to experience positive effects: The benefits of diversity were most visible at the peak point of 28/72 gender proportions. Further, managers may need to be patient: Significant results were found only when there was a time lag of five years between gender diversity and organizational performance.

The research also suggests that the benefits of diversity derived from the resource-based view of the firm are more likely to be observed on intermediate measures (employee productivity) rather than bottom-line financial measures (return on equity) (Ray et al., 2004). Employee productivity is based on operating revenue, whereas return on equity is based on net profit after tax. There are many uncontrollable financial and nonfinancial factors (e.g., non-operating expenses, racial diversity) that can have an impact on net profit after tax. The impact of gender diversity on return on equity might have been cancelled out by those factors. Previous research finds that racial diversity takes six years to affect financial performance measures (Richard et al., 2007); similarly, gender diversity might take more than five years before it starts to affect bottom-line measures. Therefore, managers should identify which performance measures are most relevant to their organizational objectives and recognize that gender diversity may have different effects across these measures.
Moreover, the study’s results suggest that a gender-diverse workforce might need to be managed differently in different industries to fully realize the benefits of diversity. For instance, close proximity to final consumers in the services industry (Bowen & Schneider, 1988) means that managers need to manage gender diversity at the employee-customer interface to capitalize on the resource of market insights. Alternatively, isolation from final consumers (Kulonda & Moates, 1986) and the lower value of market insight in the manufacturing industry suggests that manufacturing managers might need to focus on gender diversity in specific areas where they are most likely to capitalize on the resources of creativity and innovation (e.g., in research and development). But these areas account for only a small proportion of a manufacturing firm’s operations, and employee characteristics other than gender may have more impact on overall productivity. For example, advanced manufacturing technology is increasing demand for different specialized technical skills (Snell & Dean, 1992). In organizations that have heavily invested in such technology, employees’ ability to perform specialized technical jobs may be more relevant than their demographic characteristics. In other words, for manufacturing organizations, ability may trump demographic diversity (Page, 2007).

Limitations

This research has certain limitations worth noting. First, the research does not provide direct support to the resource-based view of the firm. Rather, it used the resource-based view of the firm to derive testable predictions (Barney & Mackey, 2005). A direct test of the resource-based view of the firm would measure the value, rarity, inimitability and non-substitutability of the intangible resources resulting from gender diversity and their impact on processes and/or performance (Barney, 2001; Henderson & Cockburn, 1994). Similarly, the negative effects found at high levels of organizational gender diversity provide only indirect support to self-
categorization and social identity theories, because of the level of analysis used in this research. The processes of decreased communication, lack of cohesion and cooperation, and increased conflict are best measured at the group level (Alagna et al., 1982; Jehn et al., 1999; Shapcott et al., 2006). Second, we studied gender diversity, a very salient type of demographic diversity in Australia. However, we could not take into account other types of demographic diversity such as organizational racial and ethnic diversity that might affect the gender diversity-performance relationship in other countries (Nishii & Özbilgin, 2007). Organizations in Australia are not legally required to conduct racial or ethnic audits of their workforces.
REFERENCES


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*a 2-tailed
* p < .05
** p < .01
### TABLE 2
Hierarchical Regression Analyses – Employee Productivity 2007

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<td>0.38</td>
<td>0.31</td>
<td>0.32</td>
</tr>
<tr>
<td>F</td>
<td>11.01***</td>
<td>10.41***</td>
<td>10.21***</td>
<td>9.71***</td>
<td>15.23***</td>
<td>12.64***</td>
</tr>
<tr>
<td>ΔR^2</td>
<td>0.28</td>
<td>0.02</td>
<td>0.04</td>
<td>0.04</td>
<td>0.31</td>
<td>0.00</td>
</tr>
<tr>
<td>F for ΔR^2</td>
<td>11.01***</td>
<td>5.75*</td>
<td>6.49*</td>
<td>5.61**</td>
<td>15.23***</td>
<td>0.12</td>
</tr>
</tbody>
</table>


^b Standardized coefficients are reported.

*p < .05

**p < .01

***p < .001

*p < .05

**p < .01

***p < .001
| Variables                  | Gender diversity 2002 predicting return on equity 2007 | | | | Gender diversity 2005 predicting return on equity 2007 | | | |
|---------------------------|----------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                           | Hypothesis 1a/1b                                          | Hypothesis 1c    | Hypothesis 2    | Hypothesis 1a/1b | Hypothesis 1c    | Hypothesis 2    | Hypothesis 2    |
|                           | b (Model 1)                                               | b (Model 2)     | b (Model 3)     | b (Model 4)     | b (Model 1)                                               | b (Model 2)     | b (Model 3)     | b (Model 4)     |
| Intercept                 | 39.14                                                    | 38.62           | 42.77           | 35.43           | 120.84                                                    | 120.52          | 254.51          | 264.24          |
| Controls                  |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Organization size 2002   | 2.04E-4                                                  | 2.31E-4         | 2.39E-4         | 2.07E-4         | N/A                                                       | N/A             | N/A             | N/A             |
| Organization size 2005   | N/A                                                      | N/A             | N/A             | N/A             | -1.74E-4                                                  | -1.82E-4        | 1.28E-4         | 2.98E-4         |
| Organization age          | -0.25                                                    | -0.24           | -0.24           | -0.24           | -0.72                                                     | -0.73           | -0.61           | -0.68           |
| Organization type         | -16.82                                                   | -15.46          | -16.64          | -15.43          | 130.55                                                    | 130.71          | 70.62           | 134.17          |
| Return on equity 2001     | 0.03                                                     | 0.03            | 0.03            | 0.03            | N/A                                                       | N/A             | N/A             | N/A             |
| Return on equity 2004     | N/A                                                      | N/A             | N/A             | N/A             | -0.33                                                     | -0.33           | -0.25           | -0.31           |
| Control/moderator         |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Industry type             | -8.32                                                    | -12.33          | -12.77          | -3.05           | -173.25                                                   | -172.34         | -178.41         | -352.31         |
| Predictor                 |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Gender diversity 2002     |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Polynomial term           |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Gender diversity 2002\(^2\) |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Interaction terms         |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Gender diversity 2002 × Industry type | -148.34                                                      | N/A             | N/A             | N/A             | N/A                                                       | N/A             | N/A             | N/A             |
| Gender diversity 2002\(^2\) × Industry type | -724.71                                                      | N/A             | N/A             | N/A             | N/A                                                       | N/A             | N/A             | N/A             |
| Predictor                 |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Gender diversity 2005     | N/A                                                      | N/A             | N/A             | N/A             | 15.41                                                     | -533.66         | -849.37         |                 |
| Polynomial term           |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Gender diversity 2005\(^2\) |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Interaction terms         |                                                          |                 |                 |                 |                                                          |                 |                 |                 |
| Gender diversity 2005 × Industry type | N/A                                                      | N/A             | N/A             | N/A             | 1118.86                                                   |                 |                 |                 |
| Gender diversity 2005\(^2\) × Industry type | N/A                                                      | N/A             | N/A             | N/A             | 14364.38                                                  |                 |                 |                 |
| \(R^2\)                   | 0.03                                                     | 0.03            | 0.04            | 0.04            | 0.01                                                      | 0.01            | 0.01            | 0.01            |
| \(F\)                     | 0.86                                                     | 0.88            | 0.77            | 0.72            | 0.17                                                      | 0.14            | 0.19            | 0.22            |
| \(\Delta R^2\)            | 0.03                                                     | 0.00            | 0.01            | 0.00            | 0.01                                                      | 0.00            | 0.00            | 0.00            |
| \(F for \Delta R^2\)      | 0.86                                                     | 0.98            | 0.17            | 0.58            | 0.17                                                      | 0.00            | 0.54            | 0.29            |

\(^a\) \(n = 154\) (gender diversity 2002 predicting return on equity 2007), \(n = 174\) (gender diversity 2005 predicting return on equity 2007).

\(^b\) Standardized coefficients are reported.

* \(p < .05\)

** \(p < .01\)

*** \(p < .001\)
FIGURE 1
Proposed Model of Organizational Gender Diversity and Performance

FIGURE 2
Data Points
FIGURE 3
Linear and Curvilinear Gender Diversity-Performance Relationships

FIGURE 4
Moderating Effect of Industry Type on the Curvilinear Gender Diversity-Performance Relationship