



An Investigation of Alliance Portfolio Diversity Impact on Firm Performance

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Abstract. Looking for remotely accessible assets had been portrayed as a critical piece of the advancement procedure. To get outside learning sources, firms must associate their in-house imaginative based exercises with outer accomplice to get to outer assets and extend their agreeable district. This investigation look at the experimentally that the union accomplice decent variety and union geographic assorted variety influences the levels of item and imaginative curiosity. One of the key points of the investigation is to investigate how assorted variety vital influences item advancement accomplishment in the innovative setting. Expanding on the information based hypothesis perspective of the organizations, this examination suggests that how these assorted variety portfolio including accomplices decent variety and coalition geographic decent variety, impact firm item oddity since this element reflects whether the organizations are probably going to disguise outside assets to improve their development results. This examination tests speculations drawn from the Network Advancement Overview (CIS), review by the Taiwan Service of Science and Innovation. The observationally results finding that collusion accomplice assorted variety and coalition geographic decent variety demonstrates an upset U-molded impact on curiosity.

Keywords: Alliance partner diversity · Alliance geographic diversity · Product novelty · Openness · Portfolio

1 Introduction

Since the worldwide economy supports organized commerce, this pattern may prompt worldwide aggressiveness. To reflect focused weight in the worldwide economy period, firm are opening up their authoritative limits to catch important outside assets with outer accomplices (Chesbrough 2003). Given the significance of R&D forms, the

inside and outer assets incorporation is getting to be basic to catch the combination from such action.

Outside assets are especially critical for firms in quickly changing and aggressive situations in light of the fact that their inner assets might be lacking and even improper for accomplishing leap forward advancement, expecting them to secure outer assets and to consolidate wide assortment of assets and abilities in progressing development organizations. Consequently, cooperation with numerous accomplices give firms access to an extensive variety of important assets from various fields accomplices, help in overseeing danger and vulnerability, and empower firms to remarkably profit by the particular asset commitments of accomplices (Srivastava and Gnyawali 2011).

This examination in this manner tries to break down the components influencing open development action of the cutting edge industry in Taiwanese utilizing our proposed hypothetical and exact model. To begin with, this examination exhibit the union accomplices decent variety bring different outside mechanical information and watch the specifically impact of its learning acquisitions qualities on advancement results. Second, we exhibit the partnership geographic assorted variety of encouraging Taiwan cutting edge industry and solidifying its effect on development results by breaking down components influencing its advancement arrangement. Third, this examination breaks down the impacts of partnership portfolio decent variety to grow and to improve their insight and aptitudes in imaginative procedures. The theme of this examination is essentially vital to firm supervisors since it appears in which setting transparency key are advantageous for outside assets acquisitions.

Based on the research background and motivation, the purposes of the current study are listing as following.

1. To investigate the development and trends of openness strategic of the high-tech industries in Taiwan region,
2. To develop a theoretical and empirical model that examine the alliance partner diversity and alliance geographic diversity which may drive firms innovation performance,
3. To show the impact of the expansion in the receptiveness methodology of the cutting edge firms and thus investigate whether this broadening can upgrade the development results.

2 Literature Review

2.1 Open Innovation

Development show has happened colossal changes in which has moved from the idea of shut to open advancement (Chesbrough 2003; Lichtenthaler 2011). The scholarly world and practice have turned out to be progressively mindful of the significance of open development (Chesbrough 2003; Gassmann 2006; Lichtenthaler 2011). The spearheading work of the open development was proposed by Chesbrough (2003) in which firms depend on between firm union and joint effort for pooling reciprocal mechanical assets. Past research contends that organizations take part in open

development key keeping in mind the end goal to get supplement and supplement their inward advancement endeavors (Chesbrough 2003; Hagedoorn 2002; Lichtenthaler 2008). Therefore, when a firm is opened to outside accomplices, they are probably going to seek after their own advantages for supplement or correlative in-house development sending. Firms that work together with different accomplices incorporate providers, clients, contenders, colleges, and labs that can improve the development ability they as of now have.

Two logical variables are proposed for examination as conceivable methodologies of the open development, in particular, inbound open advancement and outbound open advancement. The inbound open advancement allude to how firms to obtaining and getting to outer learning from outside performing artists. Conversely, outbound open development is to how firms to offering and uncovering thoughts or assets from and to outside associations (Chesbrough and Crowther 2006; Dahlander and Gann 2010).

2.2 External Sources and Alliance Partner Diversity

Tying down on the information based view (KBV) of the firm (Grant 1996), the essential commitments of the KBV is demonstrate how firms in giving proficient learning trade crosswise over various association limits. In the time of information economy, learning is perceived as a standout amongst the most vital and huge assets could help increment firms' advantages and make upper hand. As indicated by Grant (1996), a firm should utilize both outer and interior learning to build their esteem and make business openings. Indeed, the commitment of different accomplices to central firms' advancement procedure improvement is noteworthy (Laursen and Salter 2006; Noseleit and de Faria 2013). Cross outskirts open development instrument in cutting edge areas assume a critical part in connecting the outer assets of a firm to its inside advancement based. With the end goal of this investigation, cross outskirts open advancement is characterized as the coordinated effort between innovative firms from various fields, which may give advantage rich assets. Numerous organizations have begun to effectively gain outer information and innovation outside their limits in inward advancement base (Chesbrough 2003; Van de Vrande et al. 2006).

2.3 Alliance Portfolio Diversity and Performance

In the quick changing and aggressive market condition, it is broadly acknowledged that a company's capacity to team up is significantly depended upon the pool of various accomplices assets in supplementing their in-house development based. Researchers have analyzed the assets based view (RBV) of the organizations is the predominant hypothetical worldview in partnership portfolio decent variety (Wan et al. 2011). In like manner, discoveries on central firms taking part in working together with numerous union accomplices can give the manners by which they execute in-house advancement movement. Union accomplice assorted variety is of foremost significance for innovative firms. There firms more often than not do not have the full arrangement of cutting edge mechanical learning to viably create and deliver their R&D movement in developing business sector. In this examination we not just thought to be about coalition accomplice decent variety on the advancement results, yet in addition

consider how partnership geographic assorted variety influences their organizations’ development execution. Besides, existing examination has for the most part centered around the connection between coalition assorted variety and execution, and all the more particularly, the positive exertion on development results.

3 Methodologies

3.1 Theoretical Development and Hypotheses

An essential component in the transparency procedure of the firm is outside learning procurement by various accomplices and diverse topography. The hypothetical and experimental research propose that community oriented accomplice assorted variety is useful for the advancement execution yet just up to a bend point. We made some hypotheses as follows:

Hypothesis 1: Alliance partners diversity has an inverted U-shaped relationship with innovation performance.

Hypothesis 1a: Alliance partners diversity has an inverted U-shaped relationship with firm’s novelty.

Hypothesis 1b: Alliance partners diversity has an inverted U-shaped relationship with market novelty.

Furthermore, the qualities of cutting edge firms vary along an extensive variety of measurements and their outer advancements and information bases are produced through various geographic joint effort accomplices. We also made some hypotheses in the following:

Hypothesis 2: Alliance geographic diversity has an inverted U-shaped relationship with innovation performance.

Hypothesis 2a: Alliance geographic diversity has an inverted U-shaped relationship with firm novelty.

Hypothesis 2b: Alliance geographic diversity has an inverted U-shaped relationship with market novelty.

The purpose of this study is to examine the impact of diversity on high tech innovation performance. The proposed research model is listing in Fig. 1.

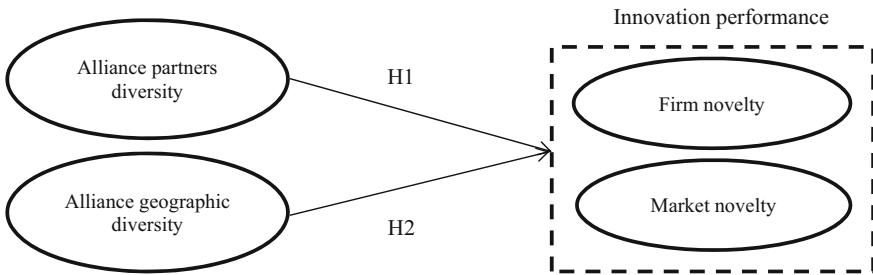


Fig. 1. Proposed research model

3.2 Data Collection

The database was utilized in this investigation embraced frame the third Network Advancement Review (CIS III) of National Science Board in Taiwan in 2012, together with a completely similar overview directed by the Establishment of Innovation, Development and Licensed innovation Administration, National Chengchi College. The example gathering relied upon Taiwan Standard Mechanical Arrangement (SIC) Framework and match OECD Standard Modern Characterization.

3.3 Estimation Methodology

Collaborative partner diversity

To catch shared accomplice decent variety, the CIS overview that inquired as to whether the central firm had any participation game plans for mechanical development exercises in the past two years is utilized. Helpful assentions can be partitioned into eight classes accomplice composes in the CIS III review. The mechanical advancement cooperation and collusion accomplices are including (1) backups, (2) providers, (3) customers or clients, (4) contenders, (5) specialists and business labs or private research establishments, (6) the R&D foundations or lab of cross-industry, (7) colleges or other advanced education establishments, (8) government explore associations and other philanthropic research association. Along these lines, the assorted variety level of collusion accomplices utilized the Blau record which is broadly utilized in earlier examinations and is viewed as the most widely recognized proportion of decent variety (Blau 1977). The Blau diversity index is defined as

$$D = 1 - \sum_{i=0}^n P_i^2 = 1 - \sum_{i=0}^n \left(\frac{n_i}{n}\right)^2$$

Where i is a particular collaboration agreements and alliance partners which across eight categories, n is the total number of possible collaboration agreements and alliance partners, n_i is the particular collaboration agreements and alliance partners in particular category, and P_i is the proportion of the potential particular collaboration agreements and alliance within the group.

Alliance geographic diversity

An all around characterized of cross-outskirt of collective assentions and partnerships had been prove an extraordinarily affect on the inventive limit. This examination additionally utilized the Blau list to gauge cutting edge firms community oriented assentions and union geographic assorted variety. The assorted variety record depends on a typology of shared assentions and unions crosswise over geographic areas that including: (1) Taiwan, (2) China, (3) America, (4) Japan, (5) Korea, (6) India, (7) Europe, and (8) different nations. The Blau diversity index is defined as

$$D = 1 - \sum_{j=0}^n P_j^2 = 1 - \sum_{j=0}^n \left(\frac{n_j}{n}\right)^2$$

where i is a collaborative agreements and alliances in the particular category and j is a particular alliance region, n_{ij} is the total number of possible collaborative agreements and alliances in particular category i across the j countries, and P_j is the proportion of the potential alliance region within the group.

In this investigation, we lead our exact examination by methods for Probit relapse estimations. Such parallel Probit display detail ought to be extremely reasonable with respect to acknowledged double ward factors under the supposition that the organizations take part in development endeavors. Consequently, we address this issue by evaluating Probit show for testing our speculations. Moreover, to test our speculations of the hypothetical advancement, this investigation utilize various leveled relapse technique to evaluate our theory. We utilize the change expansion factors (VIFs) to decide the relationship of factors, the estimations of VIFs little than 10 cut-point are acknowledged in dataset and collinearity may not exist.

Innovation performance

So as to test for the impact on development execution of a central firm, we operationalize the advancement results idea by utilizing two pointers as indicated by the CIS III review dataset. In accordance with earlier research (e.g., Köhler et al. 2012), the results of advancement endeavors was estimated utilizing a market oddity and firm oddity. From results of development endeavors, new procedures, new creates, and new administration can be spoken to the advancement achievement (Hagedoorn and Cloudt 2003).

To start with, the estimation of firm curiosity is utilized to catch the items and additionally benefits new to the firm in their advancement results. Thusly, firms offer new items or potentially benefit that are new to the firm, yet not new to the market. That is, we allude to an item and additionally administration to be another to-firm development results as it were. Second, the estimation of market curiosity was utilized to catch the development execution of a central firm through an item as well as administration as another to-showcase advancement. The study poll in CIS III got some information about whether the organizations' deliver or administration are new relative rivals in the market. The accomplishment of a development to a great extent relies upon advertise acknowledgment. Therefore, the new-to-advertise development speaks to the market oddity to catch the advancement execution in this investigation. Moreover, this investigation allude to an item as well as administration as another to-advertise development as the level of market oddity. Furthermore, this consider the item and additionally benefit new to the firm just to introduce the firm oddity.

Control variables

There is a few variables may affect the advancement endeavors of the organizations. Along these lines, this examination controlled for firm qualities in our investigations including firm size, deals, R&D force, and backup. To start with, the quantities of aggregate representatives are estimated as the firm size which may influence firms' practices and their execution (Nadler and Tushman 1997) and the connection of

advancement and execution (Caloghirou, Kastelli, and Tsakanikas 2004; Tsai 2009). That is, huge firms may have more chances to work together with outer accomplices for development assets acquisitions. Second, money related execution, for example, yearly deals (Garcia-Vega 2006), return on resources (Qian et al. 2010), return on deals, and profit for capital (Goerzen and Beamish 2005) may likewise affect on the innovative work action in upgrading imaginative results. Along these lines, we control the yearly deals that may impact the estimation consequences of development endeavors. Third, an association's R&D power speaks to development assets contribution to encouraging, recognizing, and abusing outside advancement learning and openings (Valvano and Vannoni 2003). Consequently, we incorporate the R&D force as control variable (Hitt et al. 1997). Thus, this investigation assessed R&D power as the proportion of the organizations' R&D imaginative use to yearly deal (de Leeuw et al. 2014; Quintana-García and Benavides-Velasco 2008). Furthermore, earlier research contend that backup as a remote parent organization which may bring an incredibly impact on new item advancement and development results (Belderbos et al. 2004). Subsequently, this investigation consider backup as the control variable on advancement execution.

In this examination, we lead our exact investigation by methods for Probit relapse estimations. Since our information depend on the CIS III overview, the needy factors in all model are yes or no, they are coned as 1 and zero, which implies in down to earth terms whether the firm has strived or not to new to market and new to firm advancement improvement. Such double Probit demonstrate detail ought to be exceptionally appropriate with respect to acknowledged twofold ward factors under the presumption that the organizations take part in advancement endeavors. Subsequently, we address this issue by assessing Probit show for testing our theories.

Moreover, to test our theories of the hypothetical improvement, this examination utilize progressive relapse methodology to evaluate our speculation. The progressive relapse was investigated the general clarification capacity, and how coalition accomplices decent variety and union geographic assorted variety influence the firm execution, or is it demonstrates the help of the hypothesis that our proposed. We ought to look at the autonomous factors whether have multicollinearity, that is, regardless of whether between factors have exceptionally connection. Along these lines, we utilize the difference swelling factors (VIFs) to decide the relationship of factors, the estimations of VIFs little than 10 cut-point are acknowledged in dataset and collinearity may not exist.

4 Empirical Results

4.1 Sample Analysis

In Table 1 introduces the depiction of collusion portfolio assorted variety on every industry structure, it demonstrates partnership portfolio decent variety are focuses on make of electronic parts and segments (106 firms) and make of PCs, electronic and optical items (103 firms).

Table 2 presents essential data and industry dispersion of our cutting edge test. The qualities of the examination including: the proportion of backup, firms' size, firms'

Table 1. Description of alliance portfolio diversity

Industry	<i>n</i>	Alliance partner diversity		Alliance geographic diversity	
		Mean	S.D.	Mean	S.D.
(1) Manufacturing of medicinal chemical products	9	0.519	0.100	0.377	0.215
(2) Manufacture of electronic parts and components	106	0.363	0.308	0.385	0.312
(3) Manufacture of computers, electronic and optical products	103	0.379	0.328	0.304	0.289
(4) Telecommunications	10	0.063	0.198	0.063	0.198

Note: *N* = 228; Source: compiled by this study

deals, and their R&D force. As per the aftereffects of Table 2, we locate that most firms had not an auxiliary (75%) and just 25% had a backup in our investigation test. The mass of firm size is in 101-500 workers (115 firms), and right around 70.6% firms are under 500 representatives that mirror a vast sum test of innovative firms are little and middle endeavors (SMEs) in Taiwan producing industry of this example. The firm deals has focus on 1–5 million (82 firms), and have 26.3% firms over ten million even a large portion of firms are SMEs. Research and development force implies that association’s aggregate consumption of R&D imaginative exercises on association’s yearly deals. There are 61.0% cutting edge firms spend their yearly deals from 10% to 30% in inventive exercises.

4.2 Descriptive Statistics

Table 3 records the graphic insights of the investigation that incorporate mean, standard deviations, connection and difference swelling factors (VIF) of every single real factor by SPSS 20.0. The engaging measurements of factors including firm curiosity, advertise oddity, backup, firm size, firm deals, R&D power, collusion accomplices decent variety, and partnership geographic assorted variety.

Pearson correlations presents firm novelty and market novelty have positive correlation to each other. Firm novelty is negative correlated with collaboration diversity ($\beta = -0.08$), and market novelty is significant and negative correlated with collaboration diversity ($\beta = -0.195, p < 0.01$). The collaborator diversity is positively significant correlation with alliance geographic diversity ($\beta = 0.557, p < 0.01$). Firm sales is negative correlated with firm novelty ($\beta = -0.003$) and no statistical significant, but positive and significant correlated with market novelty ($\beta = 0.112, p < 0.1$). R&D intensity is the range of a firm to innovate, and also affect the product innovation. Furthermore, there are positive and significant correlation with firm novelty ($\beta = 0.219, p < 0.01$) and market novelty ($\beta = 0.113, p < 0.1$).

The VIF are deciding the impact of multicollinearity which this examination a scope of VIF is from 1.036 to 1.559 that inside as far as possible. Thusly, the multicollinear isn’t an issue in our model setting.

Table 2. Description of data

Item	Category	Frequency	%	Cumulative%
Subsidiary	No	171	75%	75%
	Yes	57	25%	100%
Firm size	Less than 100 employees	46	20.2%	20.2%
	101–500	115	50.4%	70.6%
	501–1000	30	13.2%	83.8%
	1001–5000	33	14.5%	98.2%
	Above 5000	4	1.8%	100.0%
Firm sales	Less than 50 ten thousand	50	21.9%	21.9%
	51–100	36	15.8%	37.7%
	101–500	82	36.0%	73.7%
	501–1000	19	8.3%	82.0%
	1001–5000	26	11.4%	93.4%
	5001–10000	11	4.8%	98.2%
	Above 10000	4	1.8%	100.0%
R&D intensity	Less than 1%	17	7.5%	7.5%
	1.01% ~ 5%	47	20.6%	28.1%
	5.01% ~ 10%	17	7.5%	35.5%
	10.01% ~ 20%	72	31.6%	67.1%
	20.01% ~ 30%	67	29.4%	96.5%
	30.01% ~ 40%	3	1.3%	97.8%
	Above 50%	5	2.2%	100%

Note: $N = 228$; Source: compiled by this study.

4.3 Test of Hypotheses

Table 4 shows the aftereffects of Probit relapse for the blend of partner and collusion geographic decent variety as free factors influences the organizations' advancement execution. Model 1 and 5 shows the base model just incorporate the control factors including backup, firm size, firm deals, and Research and development power. The aftereffects of auxiliary and firm size don't effectly affect firm oddity and market oddity. Firm sales has negative effects on firm novelty ($\beta = -0.03$), conversely, it has significant and positive effects on market novelty ($\beta = 0.09$, $p < 0.1$), which suggests that firm sales would confine the level of product innovation. In addition, R&D intensity has significant and positive effects ($\beta = 0.02$, $p < 0.01$ in Model 1; $\beta = 0.01$, $p < 0.1$ in Model 5) on firm novelty and market novelty, respectively. It is implies that firms invest large R&D resources can increase innovation activity in high tech context.

Model 2 and 6 in Table 4 test the inverted-U shaped relationship between the collaboration and alliance partners diversity and innovation performance. Model 2 and 6 in Table 3 shows that the collaboration alliance diversity is significantly positive ($\beta = 4.21$, $p < 0.01$ in Model 2; $\beta = 3.16$, $p < 0.05$ in Model 6) and the quadratic collaboration alliance diversity ($\beta = -6.09$, $p < 0.01$ in Model 2; $\beta = -5.33$, $p < 0.01$ in Model 6) is significantly negative, providing support for Hypothesis 1a and 1b,

Table 3. Descriptive statistics and Pearson correlation coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Firm novelty	1							
(2) Market novelty	-0.248***	1						
(3) Subsidiary	0.043	0.053	1					
(4) Firm size	0.030	0.036	-0.100	1				
(5) Firm sales	-0.003	0.122*	0.064	0.424***	1			
(6) R&D intensity	0.219***	0.113*	0.000	0.035	0.067	1		
(7) Alliance partners diversity	-0.080	-0.195***	0.079	-0.006	-0.113*	-0.178***	1	
(8) Alliance geographic diversity	0.058	0.037	-0.078	0.057	0.032	-0.102	0.557***	1
Mean	0.78	0.82	0.25	810.46	14.46	16.78	0.363	0.334
S.D.	0.418	0.381	0.434	2105.636	2.029	14.588	0.315	0.301
VIF			1.059	1.248	1.276	1.036	1.559	1.506

*p < 0.1, **p < 0.05, ***p < 0.01; N = 228;

Source: compiled by this study.

respectively. Moreover, the connection between district assorted variety and the advancement execution (firm curiosity and market oddity) additionally looked like transformed U-formed capacities in our hypothesis 2a and 2b. Model 3 and 7 in Table 3 demonstrates that the district assorted variety isn't fundamentally positive and the quadratic area decent variety is likewise not essentially negative, giving not support to Hypothesis 2a and 2b. However, while we incorporate the collaboration and alliance partners diversity and region diversity into the Model 4 and Model 8, we found an interesting phenomena that the region diversity is significantly positive ($\beta = 2.74$, $p < 0.1$ in Model 8) and the quadratic region diversity ($\beta = -2.63$, $p < 0.1$ in Model 8) is significantly negative, providing support for Hypothesis 2b.

Table 4. Results of Probit regression

Variables	Firm novelty				Market novelty			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	0.84 (0.77)	0.86 (0.84)	0.85 (0.79)	0.92 (0.84)	-0.59 (0.79)	-0.43 (0.88)	-0.68 (0.81)	-0.46 (0.87)
Subsidiary	0.18 (0.23)	0.24 (0.23)	0.25 (0.23)	0.29 (0.24)	0.16 (0.24)	0.25 (0.25)	0.17 (.024)	0.26 (0.25)
Firm size	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Firm sales	-0.03 (0.05)	-0.04 (0.06)	-0.04 (0.06)	-0.05 (0.06)	0.09 * (0.06)	0.08 (0.06)	0.09 * (0.06)	0.08 (0.06)
R&D intensity	0.02 *** (0.01)	0.02 *** (0.01)	0.02 *** (0.01)	0.02 *** (0.01)	0.01 * (0.01)	0.02 * (0.01)	0.01 * (0.01)	0.02 * (0.01)
Alliance partners diversity		4.21 *** (1.28)		3.59 *** (1.39)		3.16 ** (1.33)		2.13 * (1.43)
Alliance partners diversity square		-6.09 *** (1.68)		-5.56 *** (1.74)		-5.33 *** (1.72)		-4.83 *** (1.78)
Alliance geographic diversity			-1.19 (1.33)	-0.40 (1.49)			0.44 (1.35)	2.74* (1.59)
Alliance geographic diversity square			2.48 (2.02)	1.41 (2.15)			-0.37 (1.99)	-2.63* (2.24)
Observations	228	228	228	228	228	228	228	228
Pseudo R-squared	0.05	0.10	0.06	0.11	0.03	0.11	0.03	0.14

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Source: compiled by this study.

5 Discussion and Conclusion

5.1 Discussion

The real discoveries are talked about as follows. In the first place, past research contended that organizations ought to continue cross fringe joint effort which can quicken advancement arrangement and require the common divulgence of logical important information (van Rijnsoever and Hessels 2011) that prompt encourage item contributions. As Escribano et al. (2009) contended outside information trade with various accomplices can give company's new and therefore to enhanced their items. Nonetheless, coalition accomplice assorted variety may bring information many-sided quality and increment administration troublesomely, and the attributes of various accomplices likely deter correspondence, learning exchange troublesome (Parkhe 1991), and worker oppose attributes (Østergaard et al. 2011) that would prompt decline advancement limit and diminish company's item improvement.

The outcomes in this examination additionally finding that the connection between union accomplices decent variety and development execution is as a reversed U-shape, which implies that the advantages of unreasonable accomplices assorted variety on

cooperation may exceed its expenses and direct portfolio assorted variety can prompt noteworthy advancement execution. Collusion accomplices assorted variety has upgrade item development on firm curiosity which implies the items or administrations are just new to the firm and have other comparative or same substitute on advertise. In this way, regardless of whether there are other item substitutes in showcase, a trade of communitarian learning still reinforce the piece of the pie of item. Moreover, our experimental proof propose that for dodge negative impacts cutting edge firms should manufacture all around planned instrument of administration, including reconciliation component of the procurement of outside information, coordination administration a wide range of partners, and segregate workers' ability.

Second, earlier research demonstrated that organizations had an altered U-formed between partnership geographic decent variety and firm execution (Qian et al. 2010); and has an upset U-molded association with item development in China (Wu and Wu 2014). In view of the previously mentioned, locale decent variety has mix impacts to firm. This investigation found that locale assorted variety has diverse result on creative execution. Our observational confirmation recommends that firm still need to team up with cross-outskirt areas.

For market novelty, alliance geographic diversity has an inverted U-shaped statistical significant relationship that reflects collaborate with multiple regions would promote firms' innovative performance. This study argues that region diversity is a crucial factor on market expanded and its development, whether firm novelty is not significant impact in our dataset. Therefore, firms should build a well platform to integrated and managed each region's difference in order to increase collaborative successful and decrease collaborative conflict. The empirical results of hypotheses in portfolio diversity and innovation performance are listed as the following Table 5.

Table 5. Results of hypotheses

Hypotheses	Results
Hypothesis 1: Alliance partners diversity has an inverted U-shaped relationship with innovation performance.	Support
Hypothesis 1a: Alliance partners diversity has an inverted U-shaped relationship with firm novelty.	Support
Hypothesis 1b: Alliance partners diversity has an inverted U-shaped relationship with market novelty.	Support
Hypothesis 2: Alliance geographic diversity has an inverted U-shaped relationship with innovation performance.	Partial support
Hypothesis 2a: Alliance geographic diversity has an inverted U-shaped relationship with firm novelty.	Not support
Hypothesis 2b: Alliance geographic diversity has an inverted U-shaped relationship with market novelty.	Support

Source: compiled by this study

5.2 Conclusion

In outline, our investigation adds to the writing and cutting edge divisions in the accompanying ways. In the first place, firms face the quickly change worldwide condition and unhindered commerce understanding, Taiwanese cutting edge firms are getting to be to build their task weight and, in this way, they contribute expansive sum Research and development assets to encourage advancement improvement. Subsequently, this investigation additionally affirms the connection between different partners (e.g. providers, clients, college, explore foundations, et cetera) and advancement execution which demonstrate that can fortify and enhance their items as well as administration aggressiveness everywhere throughout the world. Second, this investigation offers a knowledge into partnership geographic assorted variety which estimated by Taiwan, China, America, Japan, Korea India, Europe, and different nations; it additionally has altogether constructive outcomes to dispatch new item and additionally benefit and to improve firm market advancement, however it likewise not has essentially connection on association's oddity. Indeed, even that, this examination likewise proposes firm joint effort crosswise over locales, it is prudent to take outside assets and increment advancement limit. Since Taiwan's cutting edge firms are for the most part of SMEs, subsequently, while transnational coordinated effort is prescribe that shape industry affiliations or business partnership (e.g. production network) to together face the deterrents in collaboration. What's more, experimental outcomes demonstrate a U-formed connection between locale decent variety and market oddity. In this manner, these demonstrated that the derivations were generally reliable over the distinctive market firms ought to grow well administration instrument in various locale and market coordination for reinforce their market oddity.

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