Effects of SME Development Assistance: A Case of the Networking Project of the Business Development Services Providers in Thailand

# Can Efficient Provision of Business Development Services Bring Better Results for SMEs?: Evidence from a Networking Project in Thailand

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# Can Efficient Provision of Business Development Services Bring Better Results for SMEs?: Evidence from a Networking Project in Thailand

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**Abstract**

Recent systemic reviews on the impact of business development services (BDS) on small and medium enterprises (SMEs) reveal mixed effects on various outcomes. For example, the effects on improving skills or practices are often found to be positive while those on employment creation are modest and those on financial outcomes are weak. While there are many BDS providers in developing countries, SMEs' BDS usage is still very low. Studies have attributed this to reasons such as a lack of information about BDS, a shortage of credits, and the limited availability of BDS. However, most of the existing literature focuses on impacts of demand-side interventions, and empirical evidence about BDS providers is still lacking. We focus on the supply-side constraints of BDS. We take a case from Thailand in which the government, in collaboration with the Japan International Cooperation Agency, implemented a project to establish a formal network among the existing BDS providers with the aim of enhancing their effectiveness in supporting the SMEs. Using the primary data of SMEs and BDS providers, we find that the BDS providers in project provinces increased their interaction with SMEs and improved their BDS practices. SMEs' network and interactions with BDS providers also increased. We also find some positive evidence that SMEs have more contracts and more certified products on average, and provincial heterogeneous impacts on increasing profits and the percentage of domestic sales in some provinces. These together suggest that networking BDS providers improves the performances of both BDS providers and SMEs. A policy implication follows that an efficient delivery of public services can bring tangible results.

**Keywords:** SME, BDS, network, impact evaluation, Thailand

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## 1. Introduction

Impact evaluations of SME development programs have proliferated since the late 2000s (McKenzie and Woodruff 2012; Cho and Honorati 2014; Grimm and Paffhausen 2015; Cravo and Piza 2016). SME development programs are largely divided into financial and non-financial services (i.e., business development services or BDS), with the latter including various types of support ranging from management training, financial training, vocational skill training, human resource development, marketing assistance, technical advice, information provision, accounting, and legal services, among others (Sievers and Vandenberg 2007). Following the success of microfinance programs and the low quality of BDS in the past, financial supports to SMEs have become a dominant form of SME development assistance since the 1980s. However, as more impact evaluation studies of microfinance have been conducted, it was recognized that providing finance and BDS together yields better results for the SMEs than providing finance alone (McKernan 2002; Sievers and Vandenberg 2007; Grimm and Paffhausen 2015). This trend along with the increasing recognition of the importance of managerial capital in firms' performance gave rise to a strand of literature that examines the impact of business training on SMEs since the mid-2000s (Bloom and Van Reenen 2007, 2010; Bruhn, Karlan, and Schoar 2010; Bloom et al. 2012).

These studies have examined not only the impact of training on SMEs' performances, but also other factors that influence the results (Klinger and Schündeln 2011; Mano et al. 2012; Bruhn, Karlan, and Schoar 2013). For example, some researchers studied whether or not to provide with credit in addition to training (Karlan and Valdivia 2011; de Mel, McKenzie, and Woodruff 2014; Karlan, Knight, and Udry, 2015), the impacts of targeting potential entrepreneurs (de Mel et al. 2014), the heterogeneous effects of training for female entrepreneurs (Bruhn and Zia 2013), the effects of different types of trainings (Drexler, Fischer, and Schoar 2014; Higuchi, Vu, and Sonobe 2015; Suzuki, Vu, and Sonobe 2014; Valdivia 2015), whether

initial condition matters (Fossen and Büttner, 2013), and peer effects on performance (Field et al. 2016).

Overall, positive effects are often found, but the results are not clear-cut, partly due to statistical power or study designs. As summarized by McKenzie and Woodruff (2012), the managerial trainings mostly have positive effects on SMEs' performances, almost always in changing their business practices. On the other hand, based on the systemic literature review, Grimm and Paffhausen (2015) finds that effects on employment creation are very modest and depend on the design of the interventions. They find that the impacts from RCT studies are smaller than quasi-experimental studies, possibly indicating that the selection bias is still present in the latter studies. Cravo and Piza (2016) conducts systematic reviews specifically on SMEs (excluding micro-enterprises) and find that interventions have positive impacts on firm performance, employment generation, labor productivity, exports, and investment, although they do note the potential problem of the small sample size and publication bias.

Despite the modest to positive impacts found across different cases, a question remains as to why the rate of BDS usage by SMEs remains low in many developing countries. Even if the SMEs are offered chances to participate in these trainings free of charge, the take-up rate is typically about 65 percent (McKenzie and Woodruff 2012). Potential reasons for this may be a lack of information about BDS among SMEs, a lack of knowledge about the impacts of BDS (Suzuki, Vu, and Sonobe 2014), or a shortage of credit to participate in training. However, existing studies are all focused on the interventions on the demand-side, i.e., SMEs, and do not capture the constraints on the supply-side. Examples of supply-side constraints are the limited availability of BDS programs, costly transaction costs to find a suitable BDS program, or simply the low quality of services. While these problems are discussed, to our knowledge, studies that quantitatively examined the effects of supply-side constraints do not exist.

This paper therefore attempts to examine the impact of removing one of the supply-side constraints of BDS programs—the high search cost to find an appropriate BDS—on the performances of SMEs as well as BDS providers. We examine a project conducted by the

government of Thailand assisted by the Japan International Cooperation Agency (JICA), in which BDS providers are connected via a formal network for the purpose of reducing transaction costs for SMEs to receive appropriate services.  The project, which began in 2013 in four provinces, brought together BDS providers in each province, which are mostly public organizations in Thailand, to learn among themselves about their services and to develop activity plans to be more demand-oriented in delivering their services.  Further, one general consultation counter was installed in each province where the SMEs can be introduced to appropriate BDS providers.  We collected data from BDS providers and SMEs in the treatment and control provinces in 2015 and estimated the impacts of the project on the performances of BDS providers as well as SMEs, based on OLS, propensity-score matching, and inverse-propensity score weighting regressions to correct for the possible selection bias.

Overall, we find that establishing a formal network among BDS providers indeed improves their own as well as SMEs' performances.  We find that in project provinces, BDS providers increased the number of SMEs which they assisted and referred to other BDS providers relative to the control provinces.  Their BDS practice score also improved, particularly among factors relating to external relations.  We also find that SMEs enhanced their network with BDS providers in some project provinces, and that demand to consult BDS providers increased, particularly about technical and marketing issues.  SMEs' interactions with BDS providers also increased in some project provinces, and several indicators of business performances, such as receiving production contracts or having products certified, are also positively affected by the project.  We also find some evidence that the increase in the profit between the year before and after the implementation of the project was larger in some project provinces relative to others.  Further, we find that the percentage of direct export decreased while that of indirect export and domestic sales increased in some provinces due to the project. To our knowledge, this is the very first rigorous quantitative study which focused on removing the supply-side constraints of BDS providers in improving SME performance.  We also contribute to providing evidence on the effects of BDS from a South East Asian country while

most of other literature is on Latin America and Africa, as Grimm and Paffhausen (2015, 75) points out that "nothing can be said about the impact of business upport services in the East and South East Asian context." As most of BDS providers are governmental organizations in Thailand, we can also infer from our results that enhancing the effectiveness of public service delivery can bring tangible results for SMEs.

The next section describes our research questions in details. Section 3 explains about the project and data collection. Section 4 presents estimation methods employed, and the results are discussed in Section 5. A conclusion follows in Section 6.


## 2. Research Questions

We analyze two groups of agents, BDS providers and SMEs. The project has two components, which will be detailed in the next section: 1) establishing a formal network among BDS providers and 2) setting up a general consultation counter within the province where an SME can be introduced to an appropriate BDS provider. Through the network, the BDS providers were assigned to develop their own activity plans to improve their BDS activities and regularly hold meetings to exchange information. The information about BDS providers in the province was consolidated in one database.

We are interested in examining three research questions. The first is whether networking of BDS providers improves their own performance. We can think of at least three mechanisms that would allow for this improvement. Firstly, by being connected to each other, BDS providers can learn from each other how the BDS activities are variously implemented. They may learn good practices, which can be adopted in their own activities. Secondly, by enhancing communication in the network, they become aware of what types of services are offered by other BDS providers, making it easy to refer SMEs to other BDS providers when they cannot assist the SMEs. As BDS providers are typically specialists in a few areas, such as marketing, technical knowledge, or legal issues, it is likely that they cannot solve all the

problems that an SME might have. Thus, a referral system can be an effective way to increase opportunities for BDS providers to interact with SMEs. Thirdly, by discussing their activity plans amongst themselves, BDS providers will be able to consider in detail SMEs' constraints and solutions to their problems, which is expected to make them more demand-oriented. Through these mechanisms, the formation of a network is expected to bring positive effects to BDS providers' own performances.

Our second question is whether using BDS actually improves the performances of SMEs in general. This is a basic question to examine as otherwise there is no reason for SMEs to use BDS. The third question examines the impact of the project, i.e., whether the effect of BDS usage is larger if the BDS providers are connected via a formal network. We can consider two channels for how this may be possible. The first is the reduction of transaction costs, particularly the search cost of finding an appropriate BDS provider. As the information about BDS providers are integrated and a common counseling counter is installed, it will take much less time for SMEs in the project provinces to seek advice from BDS providers. As search costs decrease, the demand for BDS activities, which used to be limited by high transaction costs, is expected to expand, increasing the quantity of BDS activities purchased/used at the market. Thus, more SMEs are expected to receive BDS activities and their performance is expected to improve. Secondly, because the BDS providers connected by the project supposedly have improved their activities and become more demand-driven via the aforementioned channels, the SMEs can be better assisted and may therefore perform better than the SMEs that use BDS in other provinces. In fact, such demand-driven BDS has s high potential to improve SMEs' performances, as found in Arraiz et al. (2013). In the Supplier Development Program in Chile, the government promoted building networks of SMEs and large firms which procure products from them by subsidizing their projects. Arraiz et al. (2013) find that those SMEs improved sales, and employment and salaries for workers while the large firms also benefitted from increased sales and exports. We examine whether the SMEs and BDS providers similarly benefit from networking in the case of a JICA project in Thailand.

## 3. Details of the Networking Project and Data Collection

### 3.1 SMEs and BDS Providers in Thailand

SMEs account for a large share of Thailand's economy, as is the case in other developing and advanced countries. At the end of 2014, there were 2.7 million SMEs, comprising 99.7 percent of the total number of enterprises in the whole country, and and employing 10.5 million people, 80.3 percent of the total number of employees (Office of Small and Medium Enterprises Promotion 2015). However, the contribution of SMEs to the Gross Domestic Product and exports is limited to 39.6 and 26.3 percent, respectively. Since the business environment in Thailand is recently worsening due to an increase in labor costs accompanied by national economic growth (the so-called middle-income trap), and intensified competition due to the establishment of ASEAN Economic Community, it is urgently necessary for the government of Thailand to enhance the productivity and competitiveness of SMEs through BDS.

Most of the BDS providers in Thailand are pubic organizations. The main providers are provincial branch offices of ministries such as the Ministry of Industry and the Ministry of Commerce, governmental agencies such as the National Science and Technology Development Agency and the SME Development Bank, business associations such as the Chamber of Commerce and the Federation of Thai Industries, universities, and private companies. Types of BDS activities include consultations and training workshops on startups, production technology, product quality management, business administration, and accounting, and assistance with introducing new products, marketing, loans, and credit guarantees (JICA and UNICO International 2011).[1] Historically, there has been little cooperation and communications between these organizations and each BDS provider has operated independently. This lack of communication across BDS providers may partly reflect the government's vertically segmented

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[1] The original definition of BDS does not include financial services as explained above. However, the government of Thailand refers to the service of lending and credit guarantee as BDS, so we have adopted this broader definition of BDS, following the context of Thailand.

administrative system.  As most providers are government branches, each organization was providing BDS activity based on the mandate given by the central government and within the frame of its annual budget which was transmitted from the central government.  It was not in their culture to refer SMEs to other BDS providers if they were unable to support the SMEs requesting assistance.  In other words, BDS providers were very much supply-driven.  Thus, when managers of SMEs needed support, they were supposed to diagnose the cause of their problems by themselves and search for the BDS providers that can solve their problems. Information about available types of BDS was not collected in one place.  Accordingly, search cost to find an appropriate BDS provider was very high for SMEs, reducing the demand for BDS.


**3.2 RISMEP Project**

Recognizing the above situation, the government of Thailand decided to implement a project that established a formal network of BDS providers, with the help of JICA, an organization in charge of bilateral development assistance in Japan.  This project was among the results of assistance delivered by the government of Japan and JICA in formulating the policies for SME promotion, which has been conducted since the Asian financial crisis.  After a pilot project, the Thai government implemented a project entitled "Project for Enhancing Regional Integrated SME Promotion (RISMEP) Mechanism in the Kingdom of Thailand (hereinafter referred to as RISMEP or RISMEP project)."  It was conducted in Nakhon Ratchasima, Suphanburi, Chiang Mai, and Surat Thani from May 2013 to May 2016 (Figure 1).  The project consisted of two components: the establishment of a cooperation network of existing BDS providers, and the creation of a general consultation counter where SMEs can be introduced to appropriate BDS providers based on integrated information about BDS providers (JICA and UNICO International 2016).  In the project provinces, each Industrial Promotion Center (IPC), a regional office of the Department of Industrial Promotion, Ministry of Industry, took the initiative to organize the project activities with the support of Japanese experts dispatched by JICA.  This entailed each

network firstly examining the needs of SMEs and the types of BDS available in a province, and then developing an activity plan. Examples of these activities include regular meetings to strengthen the connection of the members, development of a database of the members' services, training for staff of the members, and public relations for the network for SMEs. Within the second component of installing a general consultation counter, the BDS providers in each province collectively prepared a procedure manual and a guidebook of BDS and conducted trainings for the SME counselor who works at the counter. During our interviews, BDS providers mentioned that through the RISMEP project they were able to introduce a SME to other more suitable BDS providers when they found it difficult to meet the request and to increase the number of participants in their training workshops by using the SME list shared within the network. In addition, each network disseminated information on the cases of successful support to SMEs in this project to SMEs to increase the awareness of the contents and effects of BDS. In this way, the RISMEP mechanism was successfully put into practice in the four provinces, and as a result, the government of Thailand decided to expand this mechanism to seven other provinces starting in October 2015 and to the whole country in near future.

### 3.3 Data Collection

As previously mentioned, the objective of this study is to examine the effects of this networking project on manufacturing SMEs and BDS providers in the project and non-project provinces based on primary data. In Thailand, manufacturing SMEs are defined to be enterprises which have fewer than 200 employees or with assets up to 200 million Thai Baht (about 5.6 million USD). Our surveys of SMEs and BDS providers were conducted in a local language by hired local consultants from November 2015 to February 2016 and were funded by JICA. In order to prepare for the surveys, we visited one of the project provinces, Suphanburi, and a non-project province, Ratchaburi, in September 2015 and examined the results of the project, the actual circumstances of BDS providers and the usage of BDS, and the characteristics of SMEs through interviews with staff of the IPC in Suphanburi and BDS providers, SME managers, and the

Japanese experts. After the visit, we finalized our questionnaires for SMEs and BDS providers and determined the details of the surveys.

First of all, we selected the following provinces for our surveys of SMEs: all project provinces and four non-project provinces, Khon Kaen, Phitsanulok, Ubon Ratchathani, and Trang (Figure 1). The non-project provinces were selected based on their similarity with the project provinces in such factors as the existence of IPC, Gross Provincial Product (GPP) per capita, the share of the manufacturing sector in GPP, the number of SMEs, and the industrial structure within the province.[2] In particular, we relied on national statistics summarized in Table 1 and made an index, which is a sum of the GPP per capita, the share of the manufacturing sector in GPP, and the number of SMEs (all standardized). We ranked all the provinces by this index and chose several provinces which are close to the project provinces in terms of this ranking as well as geographical location. We also sought expert advice from the officials of the Department of Industrial Promotion on the similarities between these provinces and the project provinces in terms of industrial structures and finally chose the above four provinces as non-project provinces.[3]

Secondly, we set the target sample size of SMEs at 500 divided between project provinces and non-project provinces. Among the former, we identified 100 SMEs who had used BDS since October 2014 (hereinafter referred to as "BDS users") and 125 SMEs who had not used BDS since October 2014 ("BDS non-users" hereafter), totaling 225 firms. Among the latter, we identified 125 BDS users and 150 BDS non-users, totaling 275 firms. In defining a BDS user in this study, we added the condition of "since October 2014" as the network of BDS providers was established in all project provinces as of around this time, although the project started in May 2013. Among the project provinces, the number of BDS users and non-users

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[2] The IPC is not located in Trang, but in Songkhla in the region. We changed from Songkhla to Trang for security reason.

[3] We thank our referees for pointing out that for future studies, more rigorous method such as the synthetic control approach developed by Abadie and Gardeazabal (2003) and Abadie, Diamond, and Hainmueller (2010) may be adopted.

selected from each province was proportional to the ratio of the number of SMEs in the respective province relative to the total number of SMEs in all the project provinces. The same rule was applied to non-project provinces.

Thirdly, we used two lists of SMEs to identify BDS users and BDS non-users. For BDS users, we relied on the list of SMEs provided by each IPC, which includes SMEs that had used BDS in each province. For BDS non-users, we used the list of manufacturing SMEs in the database of the Department of Industry Works, Ministry of Industry. As all firms are required to register their factories with the Ministry of Industry, this list can be considered as a comprehensive list of manufacturing SMEs excluding only the very small cottage-type household industries. From each list, we randomly selected the sample BDS users and BDS non-users. When making appointments for the interview, we confirmed with SME managing directors on the phone whether or not they had used BDS since October 2014, and classified them into BDS-users and BDS non-user depending on their answers.[4] We conducted face-to-face interviews with SME managing directors.

As for the survey of BDS providers, we added two more provinces, Udon Thani and Lampang, to the non-project provinces because we expected it to be difficult to secure a sufficient number of BDS providers in the non-project provinces using only the four provinces specified above. In project provinces, we targeted all of the network members, 94 BDS providers in total, and obtained 68 respondents (Table 2). Since the list of BDS providers did not exist in non-project provinces, we began by making a list of existing BDS providers referring to the names of BDS providers in the project provinces. As a result, we developed a list of 110 BDS providers in non-project provinces and obtained 69 respondents for our survey. The

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[4] Another potential method to select SMEs would be to rely on the Ministry of Industry's database only and to classify samples into BDS users and BDS non-users based on their answers on the phone. However, since the share of BDS users is low nationally, this method would likely give us very few BDS users. Due to the importance of securing a larger number of BDS users to achieve our objective, we relied on the two lists as mentioned. We control for the self-selection bias in our estimation.

survey of BDS providers was conducted on the phone after sending the questionnaire via e-mail or fax in advance.

In summary, Table 2 shows the number of sample SMEs and BDS providers in the project and non-project provinces, referred to as the "Treatment" and "Control" groups hereafter. The actual sample size of 505 total SMEs exceeded our original target number, whereas the actual sample size of BDS providers was limited to 137 in total. In addition, we found in our interviews with BDS non-users that some of them had actually participated in training workshops or received consultation services between October 2014 and September 2015, increasing the final number of actual BDS users in our dataset from 235 to 292, and decreasing the final total of actual non-users from 283 to 213. In the following estimation, we used the actual status of BDS usage.

## 4. Estimation Strategy

In order to examine the questions raised in section 2, we analyze two sets of data, one on the BDS providers and the other on the SMEs. Firstly we examine whether the RISMEP project had impacts on improving the performance of the BDS providers. In the simplest form, we are interested in estimating:

$$y = \beta_0 + \beta_1 RISMEP + X'\beta \qquad (1)$$

where y stands for various indicator of BDS providers' performances, RISMEP is a dummy variable equal to one if the BDS provider is located within the RISMEP provinces, and X are other covariates relating to the characteristics of BDS providers (years of operation, types of organization, types of services offered, total number of permanent workers in 2013, and number of workers with university degrees or higher) and of the managing directors (age, gender, ethnicity, years of education, years of BDS experience). We first run OLS regressions on this model. However, a dummy variable RISMEP may be considered endogenous to the model as the four provinces (Chiang Mai, Nakhon Ratchasima, Suphanburi, and Surat Thani) are selected

12

as the target provinces by the government. The government may have selected places where the BDS providers were operating more actively than other provinces and thus may yield better results for the project. In order to deal with this issue and given the non-availability of pre-program data, we employ a propensity-score matching method (PSM) and inverse propensity score weighting regressions (IPSWR).

Under PSM, we first estimate the probability that each BDS provider is selected as a target of the project based on the characteristics of the organization, particularly the years of operation and the types of organization. Note that the characteristics of managing directors are not included because the majority of the BDS providers are government organizations and their locations (and thus the status of being treated or not) is not up to judgment of the current managing directors. Managing directors are usually dispatched from the central ministries and thus do not influence whether the BDS provider first decided to locate themselves in that province. We match the observations based on the propensity of being under the RISMEP projects. For matching, we tried several methods (Nearest Neighbor, Caliper, Kernel, and Local Linear Regression Matching) and selected Kernel matching, which creates hypothetical observations using the information from the control group to match with the observation in the treatment group, based on the balancing tests conducted (ref. Appendix 1).

While PSM removes systematic observable differences between the treatment and control groups, it reduces efficiency in estimation (Hahn 1998; Heckman, Ichimura, and Todd 1998). Thus, we also use an inverse propensity-score weighting regression (IPSWR), which was originally proposed by Robins and Rotnitzkey (1995) and developed further by Hirano, Imbens, and Ridder (2003) among others. In this method, the inverse of the propensity score is used as weights to run regression of the outcome variable. This is also known as a "doubly-robust" estimator because only one of the models (treatment or outcome) needs to be correctly specified to achieve consistency in estimation (Wooldridge 2007). As our aim is to estimate the treatment effects on the treated, we use the weight which is equal to one for treated observations and $ps(x)/(1\text{-}ps(x))$, where $ps$ stands for propensity score, for control observations

(Hirano and Imbens 2001). Further, in order to guarantee a sufficient overlap in propensity scores of the two groups, we also use trimmed samples for analyses in addition to using the full sample.[5] For trimming, we compute the optimal cut-off points based on the method developed by Crump et al. (2006), which yielded the optimal range of [0.212, 0.787] for the BDS provider samples.[6] For the BDS provider analyses, we employ robust standard errors in OLS and IPSWR while bootstrapped standard errors are computed for the PSM analyses.[7]

In order to examine the impact of the project on SMEs, we estimate the model:

$$y = \beta_0 + \beta_1 \text{RISMEP} + \beta_2 \text{BDSuser} + \beta_3 \text{BDSuser} \times \text{RISMEP} + X'\beta \tag{2}$$

where y indicates various performance indexes for SMEs, BDSuser is a dummy variable indicating 1 if the SME used BDS since October 2014, and X includes the characteristics of the managing directors (age, gender, ethnicity, years of education, and whether succeeded the business) and of the organizations (domestic ownership, years of operation, whether it is registered, whether it belongs to any business associations, and total number of permanent workers in 2013), industrial type dummies (ISIC codes), an urban area dummy, and provincial characteristics (log of gross provincial product per capita in 2013, log of provincial population in 2013, and log of the number of SMEs in the province in 2013). The provincial variables are for controlling the heterogeneity across provinces. We do not use provincial fixed effects in our model as our treatment is based on province and thus including provincial dummies in our models will make our estimates of the treatment (RISMEP) unstable, dependent on which province is used as the base. Instead, we use the above three provincial characteristics to control for the differences across provinces. BDS user is defined as 1 if the SME has used the BDS providers' consultation services or participated in trainings offered by them since October

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[5] We report the estimation results based on trimmed samples for brevity, but the full sample yielded very similar results.

[6] While there are various ways to "trim" the samples, such as using minima-maxima criterion or based on density distribution in two groups (Caliendo and Kopeinig 2008), we rely on Crump et al. (2006) as their method is derived from a rigorous theory. Other studies, such as Chen, Mu, and Ravallion (2009) or Deininger and Liu (2013), rely on this trimming method.

[7] Due to the small number of clusters for the BDS provider survey, we used robust standard errors rather than cluster-robust standard errors.

2014.  As explained earlier, this was the time when the network of BDS providers was formed under RISMEP project.

We conduct OLS regressions on equation (2) firstly, treating RISMEP and BDS user dummies as exogenous.   However, as these variables may be endogenous, we employ the same estimations methods as the BDS provider analyses, i.e., PSM and IPSWR.   Here we estimate the propensity to use BDS or the propensity to be located in the RISMEP provinces as the weights, depending on the model specification.   Note that the limitation in our study is that we can only correct for one source of endogeneity at a time with these methods.   Thus, in estimating the equation (2), we first assume that RISMEP is an exogenous treatment and correct for the endogeneity of BDS user for the full sample analyses, as the latter endogeneity seems more important in the equation.   Then we use the subsample of BDS user only and estimate the effects of being located in the RISMEP provinces.   The control variables used in the propensity score estimations are characteristics of the managing directors (age, gender, years of education, ethnicity, and whether succeeded a family business) and those of the company (domestic ownership, years of operation, whether registered, whether belong to business associations, total number of permanent workers in 2013, urban dummy, and industrial classification codes).   As with the BDS provider analyses, we tried various matching methods and chose Caliper matching for all sample analyses and Kernel matching for user-sample only analyses based on the balancing tests results (Appendix 1).   Further, we also conducted the IPSWR estimation and used trimmed samples based on the optimal trimming method previously mentioned.   The optimal range for the all SME samples was [0.124, 0.876] while it was [0.202, 0.798] for the sub-sample of BDS users.   For all OLS and IPSWR estimations, cluster-robust standard errors are used at the district (*Amphoe*) level, while for PSM models, bootstrapped standard errors are used.   The level of cluster was determined considering the tradeoff between the minimum number of clusters required to satisfy the asymptotic assumption and variance within the cluster (Cameron and Miller 2014).   The number of clusters is 94 for the sample of all SMEs while it is 72 for the BDS user-only sample.

## 5. Estimation Results

### 5.1 Descriptive Statistics

Table 3 summarizes the characteristics of BDS providers by the status of intervention. Although we tried to select similar provinces for control groups as detailed in section 3.3, we observe some statistically significant differences in some of the variables between project and non-project provinces. Admittedly, this is a limitation to our study, and it could be improved in a future study with an experimental method or synthetic control approach (see footnote 3). In this study, we control for these differences in our estimation. We find that the years of operation is longer in non-RISMEP provinces. As we mentioned earlier, the government is the most dominant among the types of organizations, followed by universities or research institutes. There are some statistically significant differences in the types of organizations between project and non-project provinces. The most common types of BDS provided are start-up consultation, technical consultation, and product quality management. On average, these BDS providers employ about 10 permanent workers and most of them have university degrees or higher. Managing directors of these BDS providers tend to be in their late forties with about 17 years of education and 16 years of BDS experience.

Table 4 shows the characteristics of SMEs by the status of BDS use and by the status of intervention. As expected, we observe differences between BDS users and non-users in some variables. This potentially introduces a problem of endogeneity in the OLS estimation, but we correct for this problem using the estimation methods explained in the previous section. From the total sample, we observe that younger managing directors with more education tend to use BDS (Columns (1) to (3)). Among the users, the percentage of female managing directors is high relative to the non-user samples. From the company's characteristics, we see that on average it is younger firms with more permanent workers which use BDS. On average, our sample SMEs hire about 20 to 30 permanent workers. The percentage of company registration

is higher for BDS non-users than BDS users and the percentage belonging to business association is higher for BDS users. In the sub-samples, we also observe similar differences between BDS users and non BDS users (Columns (4) to (9)). Among the BDS users, we also observe that some characteristics, such as age, ethnicity, and education of managing directors, and the years of operation and size of companies, are different between treatment and control provinces (Column (10)). In the following analyses, we control for these observable differences.

**5.2 Effects on BDS Providers**

Tables 5 to 7 show the effects of RISMEP on the performances of BDS providers. Table 5 presents the results of OLS, PSM, and IPSWR on the effect of the BDS providers' network. We find that all of the coefficients are insignificant, indicating that under the RISMEP projects, the number of BDS providers that each BDS provider knows or has contacted has not increased. This may be surprising given that it is a networking project. However, as most of the BDS providers in Thailand are governmental organizations which have been operating for the average of 25.4 years, it is understandable that the BDS providers have already known each other by name at least.

However, when we look deeper into the interaction between BDS providers and SMEs, we find a different picture. Table 6 reports the impact of RISMEP on the changes in BDS providers' SME support activities. The dependent variables are differences of respective variables between one year before and one year after the establishment of the network in the RISMEP project. We find that while the budget used for SME support activities, the number of SMEs contacted by, and the number of SMEs supported without fees have not changed in any of the estimations, the number of SMEs supported with fees, the number of SMEs the BDS provider introduced to other BDS providers, and the number of SMEs which were introduced by other BDS providers increased significantly. Particularly, the number of SMEs supported with fees increased significantly in both the OLS and IPSWR models (column (4)). Finding no

17

change in the budget is as expected as most of the BDS providers rely on resources sent from central ministries, but it is striking to observe that the number of SMEs assisted with fees increased in the RISMEP provinces. This may suggest that BDS providers in the project provinces are trying to change their convention of operating only on their own budget to a more market-oriented approach of collecting necessary fees for their services to expand their businesses. This seems to show that the BDS providers are becoming more demand-oriented relative to the traditional supply-driven approach. Findings in columns (5) and (6) show that in the RISMEP provinces, the BDS providers are actively exchanging information and introducing SMEs among each other. This is quantitative confirmation of our findings from our qualitative interviews with BDS providers. Many of the BDS providers mentioned that while they knew the names of other BDS providers before the project, they were not aware of what kind of supports that other BDS providers are providing to the SMEs. This had limited their capacity to refer SMEs to other BDS providers when they found that they could not support SMEs for particular problems that SMEs raised. However, after the launch of the project, BDS providers exchanged information about what type of services they offer. The project made brochures of BDS providers in the province and the list of services offered. Further, regular BDS provider meetings enhanced social interactions among the officers who provide SME supports, lowering barriers and reducing psychological costs to introduce SMEs among each other. Thus, although the number of BDS providers' acquaintances has not changed, the quality of their network seems to have been enhanced due to the project. The average number of SMEs introduced to other BDS providers in 2013 was 108.3; being in the RISMEP project increased the number to 163.1, which is a 2.5 fold increase relative to the base figure. For the number of SMEs introduced by other SMEs, it is a 1.2 fold increase.

Table 7 presents the effects of RISMEP on the practices that each BDS provider conducts. In our interview, we asked BDS providers about 12 practices which are considered to

be positive aspects of BDS activities and made a score based on them.[8]   We divided them into

two categories, one being the internal management score of BDS providers to support SMEs and

the other the external relation activities.   Each score consists of six aspects, the details of which

are presented in Appendix 2.

We find that coefficients of the RISMEP variable are positive in all models, suggesting

that practices of BDS in the RISMEP provinces are better than their counterparts in control

provinces.   The external relation score of the OLS and IPSWR models are also statistically

significant.   In magnitude, being in the project provinces tends to increase the external relation

score by 9.7 percent (column (2)).   The BDS providers in project provinces seem to have made

efforts to expand their availability to SMEs by accepting online consultations and having

websites (Appendix 2).   However, we could not observe statistically significant impacts of the

project on the internal capacity scores of BDS providers.   This may be because the main focus

of the project is on enhancing the network and not on improving the management or consultation

capacity of each BDS provider.


## 5.3 Effects on SMEs

From above analyses, the RISMEP project seems to have had some positive impacts on the BDS

providers in the project provinces.   Now we investigate whether these positive impacts are

actually transmitted to SMEs to benefit their activities.   Tables 8 through 12 report the

estimation results on the impacts on SMEs.   While panel A presents results using all SME

samples, panel B uses the subsample of SMEs that use BDS ("BDS users") only, except for

Table 12.   In our estimating equation, there are two sources of endogeneity: one is the use of

BDS and the other is the status of intervention, i.e., being in the RISMEP province or not.   For

the PSM analyses using the full sample, we separately estimate the impacts of being in the

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[8]  While these answers are mostly subjective, we tried to minimize these effects by asking follow-up
questions whenever possible.    For example, if a respondent answered yes to the question, "Do you have
specific plans about your services in the next five years?" we asked them to explain the plan in detail.
These types of scores have been commonly used in managerial training literature.

RISMEP provinces and the impacts of using BDS. For the IPSWR analyses in panel A (all sample), we assume that being in the RISMEP provinces is exogenous and use the propensity to use BDS as a weight. In panel B, in which we use the sub-sample of BDS users only, we use the propensity to be in RISMEP province as a weight. Given the nature of our data, we are unable control for endogeneity due to two sources simultaneously in panel A, and considered the problem of endogeneity due to BDS use to be more important than the other as we see more differences in the characteristics as shown in Table 4

We first examine whether the SMEs' demand for BDS providers has expanded due to the project (Table 8). First we find that BDS-users know a greater number of BDS providers (columns (1)-(2)). However, the variable which shows the impact of the project on SMEs, i.e., the interaction term between the RISMEP dummy and the user dummy, are insignificant. In order to examine the impacts in more detail, we introduce interaction terms between treatment and province dummies in column (2). The base province is Chiang Mai, and it shows that while the project did not have significant impact overall, in Nakhon Ratchasima, the number of BDS providers that SMEs know increased and it is statistically significant at the 1 percent level. The results from the BDS-user only sample also shows that the number of BDSPs that SMEs know did not increase.

To examine the SMEs' problem-solving mechanisms, we asked SMEs whom they would consult first when they face certain kinds of problems. Specifically, we asked about problems in general, in start-ups, in credit constraint, in legal issues, in technological issues, in marketing issues, and in human resource management issues. We created dummy variables that are equal to one if the SME's answer was a BDS provider and zero otherwise, and used this as dependent variables in Table 8.[9] We observe that while BDS providers are not the first ones to be consulted by the SMEs for general issues, SMEs do recognize the importance of BDS providers for specific problems. Particularly, the user dummies are positive and statistically

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[9] OLS and PSM estimations, which show consistent results with the presented IPSWR, are not shown for brevity but are available upon request.

significant in credit, technology, marketing, and human resources, indicating that SMEs that have used BDS providers understand that the BDS providers are helpful in solving these kinds of problems. Further, it is notable that we observe a positive and statistically significant impact of the RISMEP project in increasing the reliance of SMEs on BDS providers for support with technological and marketing issues (columns (10) and (12) panel A). This may reflect the fact that the BDS providers which offer marketing advice (i.e., Provincial Commerce Office under the Ministry of Commerce) and technical advice to SMEs (i.e., Industrial Promotion Center under the Ministry of Industry) played major roles in enhancing the network among BDS providers in the RISMEP project. For example, if SMEs used BDS in the non-RISMEP provinces, the probability that this SME wishes to consult BDS providers first for the marketing issues will increase by 6.4 percent relative to non-BDS users, while it increases by 22.4 percent in Chiang Mai, 5.2 percent in Nakhon Ratchasima, and decreases by 6.7 percent in Surat Thani (Column (12) in panel A). In panel B where we use the sub-sample of BDS users only, we do not find statistical significance. Thus, it seems that SMEs in project provinces have increased the demand for BDS providers although the number of linkages with BDS providers did not increase.

In Table 9, we examine whether there have been any changes in the SMEs' interaction with BDS providers due to the RISMEP project. The dependent variables are the differences between the respective status before and after the launch of the project, thus reflecting the difference in the status ex ante. We first find that the BDS user dummies are positive in all models and statistically significant in 10 out of the 12 models. These indicate that the BDS users in all provinces increased the frequency of contacting or receiving BDS more than during the pre-project period. When we focus on the RISMEP provinces, we find that that the interaction term between the RISMEP variable and user dummies is significant and negative in Columns (10) and (12) where we examine the change in receiving BDS with fees. This suggests that in the base province Chiang Mai, the frequency of receiving paid BDS decreased. However, when we examine the provincial differences, Surat Thani, where the frequency of

21

BDS usage increased relative to the pre-RISMEP period in all three dependent variables of contacting BDS providers, receiving their services, and receiving their services with fees, stands out. This shows that in Surat Thani, SMEs are more contacting BDS providers, receiving their services, and receiving paid services. The OLS model for receiving paid BDS is also statistically significant and positive for Nakhon Ratchasima.

Further, we move on to examine whether the increased interactions between SMEs and BDS providers in RISMEP provinces shown thus far have yielded any results in improving SMEs' performances (Tables 10-12). Table 10 reports the average effect of the project while Table 11 presents provincial heterogeneous impacts and Table 12 shows the results depending on the size of SMEs. We report only the IPSWR results for brevity, but other estimations show consistent results.

Management scores tend to be higher in RISMEP provinces in panel A, and we also find that BDS users in RISMEP provinces perform better than BDS users in control provinces in panel B (Column (1)). In magnitude, they tend to score about 0.7-0.8 points higher out of the total of 9 points. BDS user dummy is also positive and significant, indicating that BDS usage increases the management score. However, the interaction terms between RISMEP and user dummy is insignificant, suggesting that the higher management scores in RISMEP provinces are not necessarily due to the project. This is understandable as the project was not specifically targeted to teach good management practices. The detailed break-down of the management score is presented in Appendix 3.

We find that RISMEP project positively affected SMEs having their products certified and receiving production contracts (Columns (2) to (3)). In magnitude, the RISMEP project increased the probability that a SME has their products certified by 25.1 percent and that a SME receives an external production contract by 15.6 percent. These seem to be quite sizeable effects. In fact, in RISMEP provinces, the probabilities of having certified products and receiving contracts are smaller than the non-project provinces as the negative coefficients of the RISMEP variable suggest in these models, but the usage of BDS mitigates these effects in

22

RISMEP provinces. This is most likely be due to the BDS providers' efforts in assisting SMEs to connect to their customers using their list of SMEs within the province and in supporting them in the application processes to have their products certified. In our fieldwork, we heard that many SMEs are not even aware of these product certifications although their products are eligible, and thus BDS providers in the project provinces put effort into recommending that they apply.

On the other hand, while in RISMEP provinces the probability of direct export is higher than in others, the BDS users in RISMEP provinces have a lower tendency to export directly (column (6)). BDS use leads to a higher probability of engaging in direct export, but the effect is negative for the RISMEP provinces. Our finding is in line with some of the other impact evaluation literature of SME support projects. For example, Martin, Mayer, and Mayneris (2011) examined whether a cluster development program implemented in France affected several firm performances including exports and found that it had no robust impacts on exports. Giuliani, Matta, and Pietrobelli (2016) examined the impacts of social networks and firm-level performances using a case of the electronics cluster in Argentina and found that promoting linkages between firms had no impact on increasing their export-oriented activities. We examine more on this later when we test provincial differences. We also observe that BDS users in general tend to subcontract more to domestic suppliers, sell less within their own provinces, and source inputs less in their own provinces (Columns (4), (7), and (9)).

We examine the effects on financial performance of sales and profit. We find that in general, SMEs (both BDS users and BDS non-users) in RISMEP provinces increased their sales and profits after the launch of the project (Columns (10)-(11)), but it was not necessarily due to the project as the interaction term is not significant. Note that due to a high refusal rate of the respondents to offer financial information, the number of observations deceased from 477 to 215 (about 45 percent) for these two models. Thus, we need to be careful in interpreting these results as this possibly introduces some self-selection bias. We did confirm that the proportion of the sample reduction is very similar between RISMEP and non-RISMEP provinces. These

findings on financial outcomes are also consistent with existing studies on impact evaluations of SME supporting projects. Many studies found that although these projects bring positive changes for SMEs in terms of adopting better practices or skills, these effects do not further produce improved financial performances (McKenzie and Woodruff 2012; Maffioli, Pietrobelli, and Stucchi 2016). Part of this may be due to the small sample size employed in these studies (Cravo and Piza 2016) or simply the timing of the survey, as suggested by many articles (McKenzie and Woodruff 2012; Alfaro, Maffioli, and Stucchi 2016). As our data is collected only after one year the network was created in these provinces, it is worthwhile to revisit these firms to examine the longer-term impacts.

Table 11 shows the heterogeneous impacts of the project across treatment provinces. For the management score, we find the project had a negative impact in Suphan Buri and no other significant impacts. For product certification, we find that in Chiang Mai, it is positive and statistically significant at 1 percent level. In magnitude, if an SME uses BDS in Chiang Mai, the probability of having product certification increases by 36.8 percent. For other provinces, the interaction terms are insignificant. The coefficients are negative for these provinces with a lower magnitude than the base coefficient of 36.8 percent. For receiving production contracts, we find that all the provincial interaction terms are statistically significant. In Chiang Mai, the probability of receiving contracts increases by 35.6 percent with the use BDS, while it increases by 0.6 percent in Surat Thani, 1.7 percent in Nakhon Ratchasima, and 3.7 percent in Suphan Buri (Column (3)). Although smaller in magnitude, the BDS users in RISMEP provinces increased their probability of receiving production contracts. The probability of subcontracting to domestic suppliers is also positive in Chiang Mai while it is negative in Nakhon Ratchasima and Suphan Buri.

For the rest of the columns, we find an interesting differing pattern for Surat Thani and Nakhon Ratchasima. In Column (11), we find that both provinces increase the log of the change in profit and they are statistically significant. For Surat Thani, it seems that they achieved this by increasing the share of indirect exports (column (6)) and the share of inputs

purchased within the province (Column (9)). On the other hand, SMEs in Nakhon Ratchasima seem to have increased the sales within the province (Column (7)) and inputs purchased from abroad (Column (8)). It is also remarkable that these two provinces are shown to have expanded their interaction with BDS in our previous tables (Table 8-9). As we confirmed during our fieldwork, the BDS providers in RISMEP provinces are introducing sales partners within the province to their customer SMEs. It is likely that these efforts increased the rate of indirect export and sales within the province. As our sample SMEs are small-scale (the median is 9 employees), it is understandable that the percentage of direct export did not increase while that of indirect export increased in some provinces.

There may be two explanations for what drove these heterogeneous effects of the RISMEP project across provinces. One is that these effects reflect different characteristics of provinces, which are not related to project, while the other is that they reflect different activities undertaken by each province under the project. While both are possible, particularly given that we were not able to control unobserved heterogeneity across provinces because of the nature of the cross-sectional data, we believe that the latter is equally important in our results because we are controlling for types of industry by industrial codes and provincial characteristics, such as gross provincial product, population, and the number of SMEs, in our regressions. In the project reports by JICA (2011), in Surat Thani, which was found to have increased the ratio of inputs purchased within province, the main problems faced by SMEs before the implementation of the project included "difficulty of sourcing inputs." On the other hand, in Nakhon Ratchasima, which was found to have increased ratio of within-province sales, "lack of marketing capacity" and "lack of market information" were listed as major obstacles for SMEs before the project. Based on the diagnostics of obstacles faced by SMEs, BDS providers in each province designed their own activities, and these might have driven heterogeneous impacts of the project. Though we are not able to statistically examine these mechanisms with our data, we note that the initial differences across provinces and the different activities undertaken in each province both account for the heterogeneous impacts found.

Lastly, when we examined whether these results are systematically different depending on the size of the company, we find that some of the effects are indeed different, particularly the number of BDS providers that SMEs know and the probability of having products certified. While the average number of permanent workers in 2013 was 21.6, the distribution is highly skewed to the right and the median is 9. Thus, we divided the sample into smaller SMEs (fewer than or equal to 9 permanent workers) and larger SMEs (more than or equal to 10 permanent workers) and conducted the previous analyses (Table 12). We find that the RISMEP project strengthened the network between BDS providers and SMEs for the smaller SMEs while it did not for the larger SMEs (Colums (1) and (7)). The demand to consult with BDS providers on credit issues decreased while the demand for BDS on technical issues increased for the smaller SMEs. These results indicate that the RISMEP project had a greater impact on the smaller SMEs in strengthening the linkage with BDS providers and in providing consultation on technical issues. On the other hand, we find that the project had positive impacts in increasing the probability of having product certifications for larger SMEs (Column (10)). This is also likely because larger SMEs may have more capacity to have product certifications once they apply. We also find that BDS use in general increases the likelihood of direct exporting for larger firms, but the effect is not necessarily due to the project. Lastly, the BDS use did not have a significant impact on profits for either larger or smaller firms.

## 6. Conclusions

This paper examined the effects of establishing a formal network among the BDS providers on the performances of the BDS providers and SMEs, taking the case of a JICA project in Thailand. This project provides a rare opportunity to examine the effects of releasing one of the supply-side constraints of BDS activities to assist SMEs in developing countries, particularly the high transaction costs in finding an appropriate BDS provider for SMEs.

Based on the data collected from BDS providers and SMEs both in project and non-project provinces, we find positive effects both on BDS providers and SMEs. In particular, due to the enhanced communication among the BDS providers, they increased the numbers of SMEs to refer to other BDS providers and the number of SMEs which they supported with fees more than the BDS providers in non-project provinces. The latter finding suggests that the BDS providers are becoming more demand-oriented while they used to work within the extent to which the public budget allowed them to assist SMEs. We also find that the BDS practice scores related to external outreach is higher for the BDS providers in the project provinces.

For SMEs, we find that the BDS users are more likely to consult BDS providers first for specific problems than BDS non-users, and that effect is particularly strong for technical and marketing issues in project provinces. These results indicate that once a SME starts using BDS and understands their benefits, they increase their demand to receive BDS from BDS providers. The number of times that a SME contacts BDS providers and participates in training organized by the BDS providers is also higher in some project provinces. We also find positive evidence of the project on outcomes of receiving production contracts and having certified products and on profit in some project provinces. We found that the RISMEP project increased the percentage of domestic sales and indirect export through agents while reducing the percentage of direct export. We also examined heterogeneous impacts of the project across provinces and the size of firms.

Overall, we find positive effects both on BDS providers and SMEs, but we should also note two limitations in our paper. First is that our results capture only the short-run effects as our data collection was conducted only one year after the network was formed in all the provinces. Although it is notable that we find some positive evidence of forming a network among the existing organizations given the short period, it is worthwhile to follow up on the SMEs to examine how this impact changes over time. Secondly, as our data is cross-sectional, we are not able to control for unobserved heterogeneity across provinces. Thus, for future studies, it will be of great interest to introduce more rigorous methods, such as a Randomized

27

Control Trial (RCT) or analysis utilizing the phase-in approach of the project expansion to other provinces to confirm the robustness of our results.

As the networking does not involve the construction of major organizations or infrastructure, it is much less costly than creating an organization from scratch. This advantage is of further importance when we consider the sustainability of the project and its expansion to other provinces after the donor's withdrawal from the project, because development projects often become unsustainable after project completion due to the shortage of resources. However, intervention on the software such as this case is more likely to be sustained if there is a cooperative attitude and motivation among BDS providers. In this regard, we observed that the incentive for BDS providers to cooperate was high in the study site because they shared a common concern about the very low usage of BDS. The decision by the Thai government to expand the RISMEP approach to other areas before the conclusion of the project also reflected their high demand for more efficient supports to SMEs. From this project, we can also infer that making the delivery of public services more efficient can indeed bring tangible results, as most of the BDS providers in Thailand are public organizations. Considering the typical vertically-segmented administrative system of the government in many countries, establishing a formal network across organizations may be the first step to bring a change to the rigid system.

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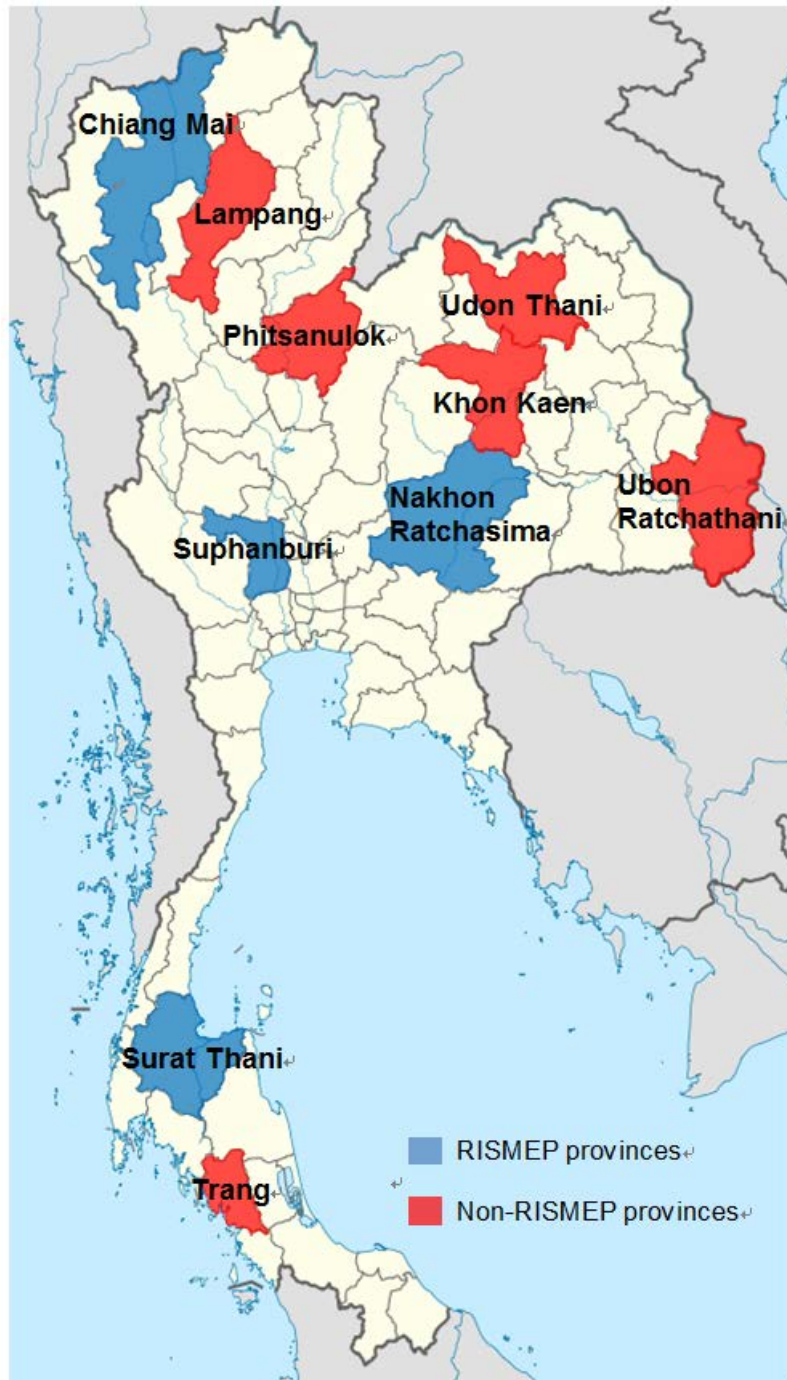
**Figure 1: Location of Sample Provinces**

*Source:* Prepared by authors adapting the map from Wikipedia Commons

## Table 1: Characteristics of Sample Provinces

| | Area size (km$^2$) | Population (1,000 persons) | GPP per capita (Baht) | Share of manufacturing sector of GPP | Number of SMEs | IPC |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *RISMEP provinces* | | | | | | |
| Nakhon Ratchasima | 20,494 | 2,508 | 96,690 | 27.1% | 77,605 | Yes |
| Suphanburi | 5,358 | 854 | 94,932 | 14.4% | 21,657 | Yes |
| Chiang Mai | 20,107 | 1,726 | 106,707 | 9.5% | 93,785 | Yes |
| Surat Thani | 12,891 | 1,029 | 157,360 | 14.8% | 54,567 | Yes |
| *Non-RISMEP provinces* | | | | | | |
| Khon Kaen | 10,886 | 1,742 | 109,556 | 38.8% | 79,293 | Yes |
| Phitsanulok | 10,816 | 906 | 102,060 | 6.3% | 30,377 | Yes |
| Ubon Ratchathani | 15,745 | 1,730 | 65,478 | 11.5% | 51,603 | Yes |
| Trang | 4,918 | 613 | 111,219 | 14.1% | 27,822 | No |
| Udon Thani | 11,730 | 1,274 | 81,419 | 14.8% | 37,822 | Yes |
| Lampang | 12,534 | 742 | 86,417 | 11.7% | 29,017 | No |

*Source:* Column (1) from National Statistical Office of Thailand Statistical Yearbook Thailand 2014, Column (2) and (3) from Office of the National Economic and Social Development Board, "Gross Regional and Provincial Product," and Column (4) and (5) from Office of Small and Medium Enterprises Promotion, "White Paper on Small and Medium Enterprises of Thailand in 2014." Each figure in the column (2)-(5) is as of 2013.

**Table 2: Sampling**

|  |  | Treatment | Control | Total |  |
|---|---|---|---|---|---|
| | **BDS user** | | | | |
| | Actual # | 128 | 164 | 292 | |
| | (Targeted #) | (103) | (132) | (235) | |
| **SMEs** | | | | | 505 |
| | | | | | (518) |
| | **BDS non-user** | | | | |
| | Actual # | 99 | 114 | 213 | |
| | (Targeted #) | (130) | (153) | (283) | |
| | | | | | |
| **BDS providers** | | 68 | 69 | 137 | |

*Note:* The total targeted number does not match with the actual number as some of the interviewed firms were actually categorized as non-SMEs and therefore dropped from our sample.

## Table 3: Summary Statistics of BDSPs

| | | Total (137) (1) | RISMEP (68) (2) | Non-RISMEP (69) (3) | *diff* (4) |
|---|---|---|---|---|---|
| *Organizational Characteristics* | | | | | |
| Years of operation | | 25.4 (17.96) | 20.2 (12.84) | 30.4 (20.64) | *** |
| Types of organization | Gov't | 65.7 (47.65) | 58.8 (49.58) | 72.5 (45.00) | * |
| | Private biz | 8.0 (27.27) | 10.3 (30.61) | 5.8 (23.54) | |
| | Private biz association | 2.9 (16.90) | 0 (0) | 5.8 (23.54) | ** |
| | Univ/research institute | 15.3 (36.16) | 20.6 (40.74) | 10.1 (30.41) | * |
| | Private bank | 1.5 (12.04) | 2.9 (17.02) | 0 (0) | |
| | Public bank | 2.2 (14.69) | 4.4 (20.69) | 0 (0) | * |
| | Others | 4.4 (20.54) | 2.9 (17.02) | 5.8 (23.54) | |
| Types of BDS provided | Startup consultation | 19.0 (39.36) | 23.5 (42.73) | 14.5 (35.46) | |
| | Technical consultation/training | 16.1 (36.85) | 16.2 (37.10) | 15.9 (36.87) | |
| | Product quality management | 13.9 (34.69) | 19.1 (39.62) | 8.7 (28.38) | * |
| | Introduction of new prod | 6.5 (24.87) | 5.9 (23.70) | 7.2 (26.12) | |
| | Managerial consultation/ training | 12.4 (33.09) | 8.8 (28.57) | 15.9 (36.87) | |
| | Accounting consultation/ training | 2.9 (16.90) | 2.9 (17.02) | 2.9 (16.90) | |
| | Marketing assistance | 8.0 (27.27) | 5.9 (23.70) | 10.1 (30.41) | |
| | Legal information | 6.6 (24.69) | 4.4 (20.69) | 8.7 (28.38) | |
| | Others | 14.6 (35.44) | 13.2 (34.14) | 15.9 (36.87) | |
| # permanent workers employed in 2013 | | 10.1 (12.97) | 8. 9 (11.11) | 11.2 (14.56) | |
| # workers with university + degree in 2013 | | 9.2 (11.24) | 8.2 (10.29) | 10. 3 (12.08) | |
| *Managing Director's Characteristics* | | | | | |
| Age of manager | | 48.3 (8.25) | 47.6 (8.40) | 48.9 (8.11) | |
| Gender of manager (% male) | | 61.3 (48.88) | 60.3 (49.29) | 62.3 (48.81) | |
| Nationality (% Thai) | | 100 | 100 | 100 | |
| Ethnicity | Thai | 97.1 (16.90) | 98.5 (12.13) | 95.7 (20.54) | |
| | Thai Chinese | 2.9 (16.90) | 1.5 (12.13) | 4.3 (20.54) | |
| Years of education | | 17.7 (1.65) | 17.6 (1.90) | 17.7 (1.37) | |
| Years of BDS experience | | 16.1 (10.12) | 14.0 (10.03) | 18.2 (9.85) | ** |

*Note:* Reported in parentheses are standard deviations. *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

# Table 4: Summary Statistics of SMEs

| | Total (505) | | | RISMEP (227) | | | Non-RISMEP (278) | | | RIS-U vs NRIS-U |
|---|---|---|---|---|---|---|---|---|---|---|
| | U (292) | NU (213) | D | U (128) | NU (99) | D | U (164) | NU (114) | D | D |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| *Managing Directors' Characteristics* | | | | | | | | | | |
| Age | 45.4 | 49.0 | *** | 46.6 | 48.7 | | 44.4 | 49.3 | *** | |
| | (11.42) | (11.78) | | (10.24) | (11.59) | | (12.21) | (11.99 | | |
| Male (%) | 56.5 | 68.1 | *** | 53.9 | 64.6 | | 58.5 | 71.1 | ** | |
| | (49.66) | (46.73) | | (50.04) | (48.05) | | (49.42) | (45.56 | | |
| Nationality: Thai (%) | 99.3 | 99.1 | | 99.2 | 98.0 | | 99.4 | 100 | | |
| | (8.26) | (9.71) | | (8.84) | (14.14) | | (7.81) | (0.00 | | |
| Ethnicity (%)  Thai | 94.5 | 96.7 | | 96.9 | 96.0 | | 92.7 | 97.4 | * | |
| | (22.80) | (17.87) | | (17.47) | (19.80) | | (26.12) | (16.08) | | |
| Thai Chinese | 4.8 | 1.9 | * | 2.3 | 2.0 | | 6.7 | 1.8 | * | * |
| | (21.40) | (13.61) | | (15.19) | (14.14) | | (25.09) | (13.19) | | |
| Malay | 0.3 | 0.0 | | 0.8 | 0.0 | | 0.0 | 0.0 | | |
| | (5.85) | (0.00) | | (8.84) | (0.00) | | (0.00) | (0.00) | | |
| Other | 0.0 | 1.4 | ** | 0.0 | 2.0 | | 0.0 | 0.9 | | |
| | (0.00) | (11.81) | | (0.00) | (14.14) | | (0.00) | (9.37) | | |
| Years of education | 14.6 | 13.1 | *** | 15.3 | 13.4 | *** | 14.0 | 12.9 | ** | *** |
| | (3.51) | (4.12) | | (2.98) | (3.88) | | (3.79) | (4.33) | | |
| *Company's Characteristics* | | | | | | | | | | |
| Domestic ownership | 97.3 | 98.1 | | 96.9 | 97.0 | | 97.6 | 99.1 | | |
| | (16.35) | (13.61) | | (17.47) | (17.23) | | (15.47) | (9.37) | | |
| Succeeded family business | 28.4 | 33.3 | | 30.5 | 29.3 | | 26.8 | 36.8 | * | |
| | (45.18) | (47.25) | | (46.21) | (45.74) | | (44.44) | (48.45) | | |
| Years of operation | 19.2 | 22.8 | *** | 20.6 | 22.3 | | 18.2 | 23.2 | *** | |
| | (14.05) | (14.20) | | (14.28) | (15.98) | | (13.82) | (12.49) | | |
| Permanent workers (2013) | 24.4 | 17.7 | ** | 29.7 | 18.4 | ** | 20.3 | 17.0 | | ** |
| | (38.17) | (28.09) | | (41.40) | (26.23) | | (35.02) | (29.72) | | |
| Registration (%) | 88.4 | 93.0 | * | 90.6 | 88.89 | | 86.6 | 96.5 | *** | |
| | (32.13) | (25.65) | | (29.26) | (31.59 | | (34.19) | (18.48) | | |
| Belonging to biz association (%) | 49.0 | 19.7 | *** | 53.9 | 24.2 | *** | 45.1 | 15.8 | *** | |
| | (50.08) | (39.88) | | (50.04) | (43.07) | | (49.91) | (36.63) | | |

*Note:* Reported in parentheses are standard deviations. *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

**Table 5: Effects of RISMEP on BDS Providers' Network among Themselves**

| | Total # BDSPs you know | Total # BDSPs you contacted | Total # individual providers you know | Total # individual providers you have contacted |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **OLS** | | | | |
| RISMEP | 4.366 | 2.932 | 2.371 | 1.707 |
| | (0.997) | (0.674) | (0.392) | (0.449) |
| *N* | 129 | 129 | 129 | 129 |
| | | | | |
| **PSM** | | | | |
| RISMEP | -0.283 | -1.801 | -8.626 | -3.975 |
| | (0.049) | (0.305) | (0.804) | (0.704) |
| *N* | 124 | 124 | 124 | 124 |
| | | | | |
| **IPSWR** | | | | |
| RISMEP | 3.918 | 2.612 | 1.899 | 2.24 |
| | (0.750) | (0.502) | (0.384) | (0.541) |
| *N* | 114 | 114 | 114 | 114 |

*Note:* Reported in parentheses are absolute values of robust t statistics. Other covariates included but not reported are: Organization's Characteristics (Years of operation, Dummies for types of organization, Dummies for types of BDS offered, Total number of permanent workers in 2013 and Numbers of workers with university or above degrees) and Managing Director's Characteristics (Age, Gender, Ethnicity, Years of education, Years of BDS experience). PSM relies on Kernel matching with bootstrapping standard errors. Inverse propensity score weighting regression models (IPSWR) use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006).

## Table 6: Effects of RISMEP on Changes in BDS Providers' SME Support Activities

| | ln(Change in budget used for BDS) | Change #SMEs contacted by | Change in #SMEs supported without fees | Change in #SMEs supported with fees | Change in #SMEs you introduce to other BDSP | Change in #SMEs introduced by other BDSP |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **OLS** | | | | | | |
| RISMEP | 1.343 | 88.018 | -54.682 | 59.732** | 176.556* | 16.907** |
| | (1.015) | (0.957) | (1.277) | (2.381) | (1.781) | (2.175) |
| *N* | 102 | 127 | 125 | 124 | 124 | 121 |
| | | | | | | |
| **PSM** | | | | | | |
| RISMEP | 2.103 | 72.984 | -18.164 | 40.366 | 116.569 | 10.527* |
| | (1.53) | (0.934) | (0.503) | (1.593) | (1.468) | (1.683) |
| *N* | 94 | 118 | 116 | 115 | 115 | 114 |
| | | | | | | |
| **IPSWR** | | | | | | |
| RISMEP | 1.455 | 62.039 | -67.091 | 49.715* | 163.094 | 11.098 |
| | (1.028) | (0.587) | (1.130) | (1.889) | (1.512) | (1.471) |
| *N* | 89 | 112 | 110 | 109 | 109 | 106 |

*Note:* Reported in parentheses are absolute values of robust t statistics. Other covariates included but not reported are: Organization's Characteristics (Years of operation, Dummies for types of organization, Dummies for types of BDS offered, Total number of permanent workers in 2013 and Numbers of workers with university or above degrees) and Managing Director's Characteristics (Age, Gender, Ethnicity, Years of education, Years of BDS experience). PSM relies on Kernel matching with bootstrapping standard errors. Inverse propensity score weighting regression models (IPSWR) use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006). *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

**Table 7: Effects of RISMEP on BDS Providers' Practices in Supporting SMEs**

| | Internal Capacity Score (6 max) | External Outreach Score (6 max) | Total Score (12 max) |
|---|---|---|---|
| | (1) | (2) | (3) |
| *OLS* | | | |
| RISMEP | 0.434 | 0.626$^{*}$ | 1.06 |
| | (1.203) | (1.847) | (1.699) |
| *N* | 129 | 129 | 129 |
| *PSM* | | | |
| RISMEP | 0.212 | 0.433 | 0.645 |
| | (0.506) | (1.241) | (0.931) |
| *N* | 124 | 124 | 124 |
| *IPSWR* | | | |
| RISMEP | 0.266 | 0.581$^{*}$ | 0.847 |
| | (0.633) | (1.779) | (1.27) |
| *N* | 114 | 114 | 114 |

*Note:* Reported in parentheses are absolute values of robust t statistics. Other covariates included but not reported are: Organization's Characteristics (Years of operation, Dummies for types of organization, Dummies for types of BDS offered, Total number of permanent workers in 2013 and Numbers of workers with university or above degrees) and Managing Director's Characteristics (Age, Gender, Ethnicity, Years of education, Years of BDS experience). PSM relies on Kernel matching with bootstrapping standard errors. Inverse propensity score weighting regression models (IPSWR) use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006). *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

**Table 8: Effects of RISMEP on SMEs' Demand for BDS Providers in Problem-Solving**

| | #BDSPs you know | | Start-ups | | Credit | | Legal issues | | Technology | | Marketing | | HR | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| *A: ALL SAMPLE* | | | | | | | | | | | | | | |
| RISMEP | -1.486** | -1.194* | -0.003 | -0.006 | 0.034 | 0.041 | 0 | -0.004 | -0.047 | -0.061** | 0.029 | 0.001 | -0.002 | -0.008 |
| | (2.353) | (1.838) | (0.060) | (0.151) | (0.885) | (0.923) | (0.007) | (0.064) | (1.418) | (2.066) | (0.662) | (0.028) | (0.063) | (0.239) |
| User | 2.842*** | 2.914*** | 0.026 | 0.028 | 0.060*** | 0.062*** | 0.027 | 0.027 | 0.106*** | 0.111*** | 0.056* | 0.064** | 0.121*** | 0.120*** |
| | (5.116) | (5.532) | (0.999) | (1.093) | (3.066) | (3.041) | (1.355) | (1.377) | (3.613) | (3.703) | (1.947) | (2.308) | (2.968) | (2.904) |
| RISMEP x User | -0.059 | -1.43 | -0.005 | 0.049 | -0.064 | -0.109 | -0.042 | -0.005 | 0.061 | 0.117* | 0.058 | 0.160** | -0.075 | -0.1 |
| | (0.079) | (1.471) | (0.093) | (0.939) | (1.558) | (1.283) | (1.094) | (0.133) | (1.248) | (1.737) | (1.313) | (2.21) | (1.429) | (1.281) |
| ST x User | | 0.595 | | -0.084 | | 0.023 | | -0.036 | | -0.16 | | -0.291*** | | 0.029 |
| | | (0.627) | | (0.883) | | (0.34) | | (0.504) | | (1.594) | | (3.617) | | (0.396) |
| NR x User | | 3.335*** | | -0.082 | | 0.099 | | -0.065 | | -0.089 | | -0.172* | | 0.016 |
| | | (3.118) | | (1.201) | | (0.983) | | (1.021) | | (1.128) | | (1.762) | | (0.216) |
| SB x User | | 1.261 | | -0.126 | | 0.069 | | -0.08 | | -0.029 | | -0.028 | | 0.139 |
| | | (0.746) | | (0.947) | | (0.998) | | (0.548) | | (0.234) | | (0.165) | | (1.034) |
| | | | | | | | | | | | | | | |
| *B: USER SAMPLE ONLY* | | | | | | | | | | | | | | |
| RISMEP | -0.600 | | -0.035 | | -0.01 | | -0.038 | | 0.07 | | 0.088 | | -0.057 | |
| | (0.894) | | (0.740) | | (0.273) | | (0.850) | | (1.127) | | (1.614) | | (0.949) | |

*Note:* IPSWR are used in estimation. Reported in parentheses are absolute values of cluster-robust t statistics at district (Amphoe) level. Number of observations is 477 for panel A and 259 for panel B. Other covariates included but not reported are: Age, Gender, Ethnicity, Years of education, Whether domestic ownership, Whether succeeded family business, Years of operation, Whether registered, Whether belong to any business associations, Total permanent workers in 2013, Urban dummy, ISIC codes, log of gross provincial product in 2013, log of provincial population in 2013, and log of number of SMEs in 2013. IPSWR models use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006). Weights used in IPSWR of Panel A are based on the propensity to use BDS while those of Panel B are based on the propensity to be under RISMEP project. *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

**Table 9: Effects of RISMEP on SMEs' Interaction with BDS Providers**

| | Change in number of times in: | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Contacting BDSP | | | | Receiving BDS | | | | Receiving BDS with fees | | | |
| | OLS | | IPSWR | | OLS | | IPSWR | | OLS | | IPSWR | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| **A: ALL SAMPLE** | | | | | | | | | | | | |
| RISMEP | 0.792 | 0.526 | -0.008 | 0.139 | -0.125 | -0.161 | -0.053 | -0.064 | -0.013 | 0.02 | 0.004 | 0.028 |
| | (0.834) | (0.952) | (0.054) | (1.541) | (0.651) | (1.349) | (0.303) | (0.546) | (0.378) | (0.789) | (0.11) | (1.029) |
| User | 1.236 | 0.98 | 0.473** | 0.316* | 0.484*** | 0.435*** | 0.568*** | 0.533*** | 0.148*** | 0.122*** | 0.152*** | 0.135*** |
| | (1.492) | (1.335) | (2.188) | (1.679) | (3.251) | (3.133) | (4.906) | (4.636) | (3.61) | (2.905) | (3.117) | (2.667) |
| RISMEP x User | -0.922 | -0.009 | 0.545 | 0.217 | 0.236 | 0.132 | 0.245 | -0.054 | -0.065 | -0.211*** | -0.05 | -0.121* |
| | (0.578) | (0.015) | (1.4) | (0.509) | (0.67) | (0.675) | (0.71) | (0.214) | (0.851) | (2.894) | (0.753) | (1.778) |
| ST x User | | 2.442* | | 3.311** | | 0.753** | | 0.837** | | 0.546*** | | 0.465** |
| | | (1.735) | | (2.465) | | (2.446) | | (2.542) | | (3.182) | | (2.419) |
| NR x User | | -3.573 | | -0.12 | | -0.213 | | 0.233 | | 0.184** | | 0.073 |
| | | (1.014) | | (0.271) | | (0.258) | | (0.263) | | (2.233) | | (0.894) |
| SB x User | | -0.107 | | -0.533 | | 0.724 | | 1.025 | | 0.124 | | -0.061 |
| | | (0.114) | | (1.211) | | (1.216) | | (1.511) | | (1.211) | | (0.637) |
| *N* | 496 | 496 | 470 | 470 | 484 | 484 | 458 | 458 | 480 | 480 | 454 | 454 |
| | | | | | | | | | | | | |
| **B: USER SAMPLE ONLY** | | | | | | | | | | | | |
| RISMEP | 0.156 | | -0.154 | | 0.131 | | 0.188 | | -0.101 | | -0.141 | |
| | (0.257) | | (0.192) | | (0.628) | | (0.769) | | (1.532) | | (1.529) | |
| *N* | 286 | | 253 | | 275 | | 244 | | 271 | | 241 | |

*Note:* Reported in parentheses for OLS and IPSWR are absolute values of cluster-robust t statistics at district (Amphoe) level. Other covariates included but not reported in OLS and IPSWR are: Age, Gender, Ethnicity, Years of education, Whether domestic ownership, Whether succeeded family business, Years of operation, Whether registered, Whether belong to any business associations, Total permanent workers in 2013, Urban dummy, ISIC codes, log of gross provincial product in 2013, log of provincial population in 2013, and log of number of SMEs in 2013. IPSWR models use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006). Weights used in IPSWR of Panel A are based on the propensity to use BDS while those of Panel B are based on the propensity to be under RISMEP project. *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

## Table 10: Effects of RISMEP on SMEs' Performances

| | Mgt Practice Score (9 max) | Have certified products | Receive production contracts | Subcontract to domestic suppliers | Export directly | Ratio of indirect export | Ratio of within province sales | Ratio of inputs imported | Ratio of inputs purchased within province | ln(change in sales) | ln(change in profit) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| **A: ALL SAMPLE** | | | | | | | | | | | |
| RISMEP | 0.686* | -0.191** | -0.173*** | -0.004 | 0.219*** | 0.295 | -5.84 | 0.866 | -5.929 | 4.220** | 4.328** |
| | (1.846) | (2.284) | (2.692) | (0.123) | (4.144) | (0.114) | (0.760) | (0.557) | (1.122) | (2.432) | (2.642) |
| User | 0.636* | 0.064 | -0.011 | 0.063*** | 0.100*** | 0.879 | -19.220*** | 1.033 | -7.909* | 1.755 | 1.099 |
| | (1.842) | (0.906) | (0.283) | (3.303) | (2.827) | (0.269) | (3.175) | (0.604) | (1.679) | (1.26) | (1.415) |
| RISMEP x User | -0.254 | 0.251*** | 0.156** | 0.042 | -0.125** | -0.304 | 10.181 | 2.55 | 4.033 | -1.262 | -1.704 |
| | (0.650) | (2.669) | (2.303) | (0.947) | (2.141) | (0.069) | (1.342) | (1.076) | (0.53) | (0.655) | (1.222) |
| *N* | *474* | 477 | 477 | 477 | 477 | 475 | 475 | 476 | 476 | 215 | 207 |
| | | | | | | | | | | | |
| **B: USER SAMPLE ONLY** | | | | | | | | | | | |
| RISMEP | 0.827*** | 0.137 | -0.041 | 0.032 | 0.102** | 0.171 | 3.856 | 0.103 | 9.23 | 0.124 | 0.628 |
| | (3.059) | (1.498) | (0.658) | (0.725) | (2.158) | (0.098) | (1.022) | (0.025) | (1.602) | (0.103) | (0.439) |
| *N* | *259* | 259 | 259 | 259 | 259 | 257 | 258 | 258 | 258 | 146 | 136 |

*Note:* IPSWR are used in estimation. Reported in parentheses are absolute values of cluster-robust t statistics at district (Amphoe) level. Other covariates included but not reported are: Age, Gender, Ethnicity, Years of education, Whether domestic ownership, Whether succeeded family business, Years of operation, Whether registered, Whether belong to any business associations, Total permanent workers in 2013, Urban dummy, ISIC codes, log of gross provincial product in 2013, log of provincial population in 2013, and log of number of SMEs in 2013. IPSWR models use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006). Weights used in IPSWR of Panel A are based on the propensity to use BDS while those of Panel B are based on the propensity to be under RISMEP project. *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

**Table 11: Heterogeneous Effects of RISMEP on SMEs' Performances**

| | Mgt practice Score (9 max) | Have certified products | Receive production contracts | Subcontract to domestic suppliers | Export directly | Ratio of indirect export | Ratio of within province sales | Ratio of inputs imported | Ratio of inputs purchased within province | ln(change in sales) | ln(change in profit) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| *ALL SAMPLE* | | | | | | | | | | | |
| RISMEP | 0.65 | -0.212** | -0.202*** | -0.006 | 0.227*** | 1.58 | -4.073 | 1.994 | -5.92 | 5.632*** | 6.993*** |
| | (1.61) | (2.496) | (3.109) | (0.174) | (4.586) | (0.678) | (0.513) | (1.43) | (1.185) | (3.649) | (7.703) |
| User | 0.657* | 0.071 | -0.003 | 0.062*** | 0.098** | 0.308 | -18.980*** | 1.059 | -9.238** | 1.691 | 1.431** |
| | (1.904) | (1) | (0.091) | (2.979) | (2.624) | (0.094) | (3.120) | (0.653) | (1.988) | (1.212) | (2.039) |
| RISMEP x User | 0.195 | 0.368*** | 0.356*** | 0.140** | -0.109 | -2.72 | 0.225 | -1.084 | 3.503 | -1.941 | -4.341** |
| | (0.389) | (3.105) | (4.768) | (2.383) | (1.423) | (0.703) | (0.025) | (0.320) | (0.524) | (0.682) | (2.530) |
| ST x User | -0.805 | -0.249 | -0.350*** | -0.049 | 0.048 | 14.465** | 7.695 | 5.095 | 22.401* | 2.811 | 4.988*** |
| | (1.339) | (1.319) | (3.424) | (0.497) | (0.452) | (2.388) | (0.589) | (0.548) | (1.805) | (0.748) | (2.706) |
| NR x User | -0.646 | -0.196 | -0.339*** | -0.175** | -0.023 | 3.049 | 21.729** | 8.572* | -7.818 | 2.633 | 4.981** |
| | (1.305) | (1.481) | (3.262) | (2.202) | (0.217) | (0.58) | (2.248) | (1.94) | (0.646) | (0.957) | (2.293) |
| SB x User | -1.032* | -0.138 | -0.319** | -0.281** | -0.134 | -5.55 | 12.898 | -0.159 | 1.407 | -8.027* | -8.582** |
| | (1.986) | (0.716) | (2.316) | (2.152) | (1.018) | (1.114) | (1.06) | (0.056) | (0.1) | (1.774) | (2.529) |
| *N* | 474 | 477 | 477 | 477 | 477 | 475 | 475 | 476 | 477 | 215 | 207 |

*Note:* IPSWR are used in estimation.   Reported in parentheses are absolute values of cluster-robust t statistics at district (Amphoe) level.   Other covariates included but not reported are: Age, Gender, Ethnicity, Years of education, Whether domestic ownership, Whether succeeded family business, Years of operation, Whether registered, Whether belong to any business associations, Total permanent workers in 2013, Urban dummy, ISIC codes, log of gross provincial product in 2013, log of provincial population in 2013, and log of number of SMEs in 2013.   IPSWR models use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006).   Weights used are based on the propensity to use BDS.   *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

**Table 12: Effects of RISMEP on SMEs' Performances by Size of SMEs**

| | A. Smaller SMEs | | | | | | B. Larger SMEs | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # BDSPs you know | Consult BDSP for credit | Consult BDSP for technology | Have certified products | Export | % Sales within province | # BDSPs you know | Consult BDSP for credit | Consult BDSP for technology | Have certified products | Export | % Sales within province |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| RISMEP | -0.778 | 0.072 | -0.055 | -0.152 | 0.022 | 1.499 | -2.381** | 0.023 | -0.005 | -0.176 | 0.368*** | -16.944 |
| | (1.524) | (0.9) | (1.252) | (1.373) | (0.398) | (0.252) | (2.409) | (0.939) | (0.102) | (1.478) | (3.903) | (1.473) |
| User | 2.140*** | 0.094** | 0.074** | 0.079 | 0.016 | -19.682*** | 3.569*** | 0.038* | 0.100** | -0.037 | 0.201*** | -21.619** |
| | (5.324) | (2.622) | (2.109) | (0.667) | (0.344) | (3.329) | (4.159) | (1.701) | (2.269) | (0.308) | (2.828) | (2.022) |
| RISMEP x User | 1.220* | -0.154* | 0.125** | 0.211 | 0.05 | 3.592 | -0.947 | -0.014 | 0.045 | 0.358** | -0.202* | 14.816 |
| | (1.951) | (1.690) | (2.238) | (1.425) | (0.726) | (0.412) | (0.827) | (0.421) | (0.591) | (2.454) | (1.923) | (1.133) |
| N | 255 | 255 | 255 | 255 | 255 | 255 | 249 | 249 | 249 | 249 | 249 | 247 |

*Note:* IPSWR are used in estimation. Reported in parentheses are absolute values of cluster-robust t statistics at district (Amphoe) level. Other covariates included but not reported are: Age, Gender, Ethnicity, Years of education, Whether domestic ownership, Whether succeeded family business, Years of operation, Whether registered, Whether belong to any business associations, Total permanent workers in 2013, Urban dummy, ISIC codes, log of gross provincial product in 2013, log of provincial population in 2013, and log of number of SMEs in 2013. IPSWR models use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006). Weights used are based on the propensity to use BDS. *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

## Appendix 1: Balancing Test Results

| | | # sig. variables | Pseudo R2 | P-value LR test | Mean Bias |
|---|---|---|---|---|---|
| **BDSP** | | | | | |
| RISMEP | Before matching | 2 | 0.092 | 0.007 | 30.9 |
| | Caliper | 0 | 0.029 | 0.504 | 11.1 |
| | Kernel | 0 | 0.005 | 0.944 | 5.6 |
| | Nearest Neighbor | 0 | 0.016 | 0.674 | 9.7 |
| | | | | | |
| **SME: ALL SAMPLE** | | | | | |
| RISMEP | Before matching | 4 | 0.046 | 0.003 | 11.9 |
| | Caliper | 0 | 0.002 | 1 | 2.0 |
| | Kernel | 0 | 0.005 | 0.996 | 4.0 |
| | Nearest Neighbor | 1 | 0.026 | 0.239 | 9.4 |
| | | | | | |
| USER | Before matching | 8 | 0.133 | 0 | 20.6 |
| | Caliper | 0 | 0.003 | 1 | 2.7 |
| | Kernel | 1 | 0.010 | 0.863 | 4.6 |
| | Nearest Neighbor | 3 | 0.024 | 0.114 | 8.9 |
| | | | | | |
| **SME: USER SAMPLE ONLY** | | | | | |
| RISMEP | Before matching | 5 | 0.103 | 0.023 | 11.9 |
| | Caliper | 0 | 0.022 | 1 | 5.3 |
| | Kernel | 0 | 0.005 | 1 | 2.8 |
| | Nearest Neighbor | 2 | 0.052 | 0.823 | 9.6 |

**Appendix 2: Effects of RISMEP on BDS Providers' Practices in Supporting SMEs**

| | Internal Capacity Score (6) | | | | | | External Outreach Score (6) | | | | | | Total Score (12 max) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Have systematic tools to analyze problems | File records of consultations | Keep customers' evaluation | Have a training program for workers | Share customers' voices among workers | Have specific plans in the next five years | Follow up on the SMEs after consultations | Accept consultations via email | Maintain a list of external individual consultants | Keep lists of SMEs which contacted | Have a website | Have advertised services to SMEs | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| **OLS** | | | | | | | | | | | | | |
| RISMEP | 0.11 | 0.168$^{**}$ | 0.108 | -0.009 | -0.085 | 0.142 | 0.111 | 0.184 | 0.082 | 0.005 | 0.140$^{*}$ | 0.103 | 1.06 |
| | (0.964) | (2.75) | (0.91) | (0.086) | (0.998) | (1.149) | (1.24) | (1.485) | (1.587) | (0.065) | (1.742) | (1.195) | (1.699) |
| N | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| **PSM** | | | | | | | | | | | | | |
| RISMEP | 0.159$^{**}$ | 0.134 | 0.006 | -0.011 | -0.144$^{*}$ | 0.068 | 0.08 | 0.123 | 0.079 | -0.023 | 0.146$^{*}$ | 0.027 | 0.645 |
| | (2.051) | (1.261) | (0.054) | (0.115) | (1.824) | (0.554) | (1.1) | (1.248) | (0.633) | (0.310) | (1.792) | (0.316) | (0.931) |
| N | 124 | 124 | 124 | 124 | 124 | 124 | 124 | 124 | 124 | 124 | 124 | 124 | 124 |
| **IPSWR** | | | | | | | | | | | | | |
| RISMEP | 0.107 | 0.149 | 0.066 | -0.049 | -0.096 | 0.09 | 0.088 | 0.206$^{**}$ | 0.08 | 0.006 | 0.111 | 0.09 | 0.847 |
| | (1.00) | (1.346) | (0.635) | (0.470) | (1.209) | (0.776) | (1.08) | (2.129) | (0.841) | (0.073) | (1.461) | (0.934) | (1.27) |
| N | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 114 |

*Note:* IPSWR are used in estimation. Reported in parentheses are absolute values of cluster-robust t statistics at district (Amphoe) level. Other covariates included but not reported are: Age, Gender, Ethnicity, Years of education, Whether domestic ownership, Whether succeeded family business, Years of operation, Whether registered, Whether belong to any business associations, Total permanent workers in 2013, Urban dummy, and ISIC codes. IPSWR models use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006). Weights used in IPSWR of Panel A are based on the propensity to use BDS while those of Panel B are based on the propensity to be under RISMEP project. *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

**Appendix 3: Effects of RISMEP on SMEs' Management Practices**

| | Separate biz and household expenses | Keep business records | Summarize biz perform once per month+ | Have mechanism to monitor product quality | Have mechanism to hear customers' voices | Share customers' voices among workers | Have sales or profit target for the year | Have plans for growth for next 5 years | Share the goal with all workers | TOTAL SCORE (max 9) |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| **A: ALL SAMPLE** | | | | | | | | | | |
| RISMEP | 0.212*** | 0.150** | -0.12 | -0.001 | 0.005 | -0.009 | 0.197*** | 0.04 | 0.208* | 0.686* |
| | (3.311) | (2.233) | (1.107) | (0.012) | (0.057) | (0.107) | (2.83) | (0.404) | (1.924) | (1.846) |
| User | 0.11 | 0.044 | -0.133** | 0.017 | 0.065 | 0.089 | 0.079 | 0.176* | 0.184*** | 0.636* |
| | (1.481) | (0.885) | (2.063) | (0.202) | (0.947) | (1.075) | (1.109) | (1.879) | (2.814) | (1.842) |
| RISMEP x User | -0.213** | -0.079 | 0.245** | -0.016 | -0.015 | -0.018 | -0.109 | -0.054 | 0.008 | -0.254 |
| | (2.466) | (1.333) | (2.411) | (0.174) | (0.184) | (0.179) | (1.229) | (0.500) | (0.095) | (0.650) |
| N | 477 | 477 | 477 | 477 | 477 | 474 | 477 | 477 | 477 | 477 |
| | | | | | | | | | | |
| **B: USER SAMPLE ONLY** | | | | | | | | | | |
| RISMEP | 0.024 | 0.02 | 0.116* | 0.035 | 0.088 | 0.025 | 0.174*** | 0.124* | 0.220** | 0.827*** |
| | (0.404) | (0.422) | (1.728) | (0.771) | (1.232) | (0.635) | (3.081) | (1.706) | (2.456) | (3.059) |
| N | 259 | 259 | 259 | 259 | 259 | 259 | 259 | 259 | 259 | 259 |

*Note:* IPSWR are used in estimation.    Reported in parentheses are absolute values of cluster-robust t statistics at district (Amphoe) level.    Other covariates included but not reported are: Age, Gender, Ethnicity, Years of education, Whether domestic ownership, Whether succeeded family business, Years of operation, Whether registered, Whether belong to any business associations, Total permanent workers in 2013, Urban dummy, ISIC codes, log of gross provincial product in 2013, log of provincial population in 2013, and log of number of SMEs in 2013.    IPSWR models use trimmed samples with trimming thresholds calculated by the optimal trimming method by Crump et al. (2006).    Weights used in IPSWR of Panel A are based on the propensity to use BDS while those of Panel B are based on the propensity to be under RISMEP project.    *: significant at 10% level, **: significant at 5% level, and ***: significant at 1% level.

**Abstract (in Japanese)**

要約

　技術向上やデザイン刷新、マーケティング強化等で経営面をサポートする中小企業支援サービスを総称して Business Development Service (BDS)と呼ぶが、そのインパクトについての評価は一定しておらず、途上国における中小企業の BDS 利用度も非常に低い。その原因として、BDS に関する情報や利用資金の不足、BDS へのアクセスが限定的であること等が挙げられる。しかし、先行研究の多くは BDS の需要側である中小企業だけに焦点を当てており、供給側である BDS プロバイダーの課題についてのエビデンスが欠如している。

　本稿は BDS の供給側の制約に着目し、タイで実施された JICA 技術協力プロジェクトを分析対象とした。本プロジェクトでは、BDS プロバイダーによる中小企業支援の効果の向上を目指し、既存の BDS プロバイダーのネットワーク化を実施した。中小企業と BDS プロバイダーの一次データを用いた分析からは、まずプロジェクト対象県の BDS プロバイダーが企業との接触を増やし、活動内容を改善させたことが分かった。また、中小企業側でも BDS プロバイダーとの関わりが増えたことが確認された。さらに、プロジェクト対象県で BDS を利用した企業は、生産契約や製品の認証をより多く受けており、一部の対象県では利益や国内の販売比率を向上させた。これらの結果は、BDS プロバイダーのネットワーク化が BDS プロバイダーと中小企業双方の業績を向上させたことを示しており、効率的な公共サービスの提供が確かな結果につながりうるという政策的インプリケーションを導出するものである。