

# Management skill, entrepreneurial mindset, and enterprise survival: Evidence from randomized experiments and repeated surveys in Vietnam

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Empirical Management Conference

December 7, 2017

# Background

- Mixed impact of business training intervention [McKenzie and Woodruff, 2014 WBRO]
- Importance of analyzing long-term firm dynamics after intervention: cf. Giorcelli [2016 mimeo]
- Bloom et al. [2017 mimeo] find longer-term impact of their 2013/QJE business consultation in India
- Our intervention with repeated survey
  - ✓ Simplified (and thus scalable) intervention
  - ✓ Larger sample size (admittedly not very large)
  - ✓ Small manufacturers (representative firms in developing world)

# What We Do

- RCT of management training for Vietnamese small manufacturers in 2010
- Standard ILO module and production management
- Follow-up survey in 2011, 2013, and 2016

## Findings

5 years after the training, treated enterprises are

- more likely to survive
- having higher business performance

Mechanism: Sustainably improved management skill and entrepreneurial mindset

# Related Literature

## Established literature on enterprise survival

- Dunne et al. [1989 QJE], Evans [1987 JPE], and many more (both theory and empirics) mostly focusing on enterprise size, age, and human capital of entrepreneurs
- Recently, Bloom et al. [2012 AMP] find that better management is associated with enterprise survival among medium to large manufacturers

-> This is the case for small manufacturers in the developing world

## Small but growing literature on identification of "gazelles"

- Diao et al. [2016 mimeo]; Fafchamps and Woodruff [2017 WBER]; Grimm et al. [2012 WD]; McKenzie [2015 mimeo]

-> Training works as a screening device

# Outline

## Experimental design

- ✓ Study site
- ✓ Timeline
- ✓ Intervention

## Empirical specification

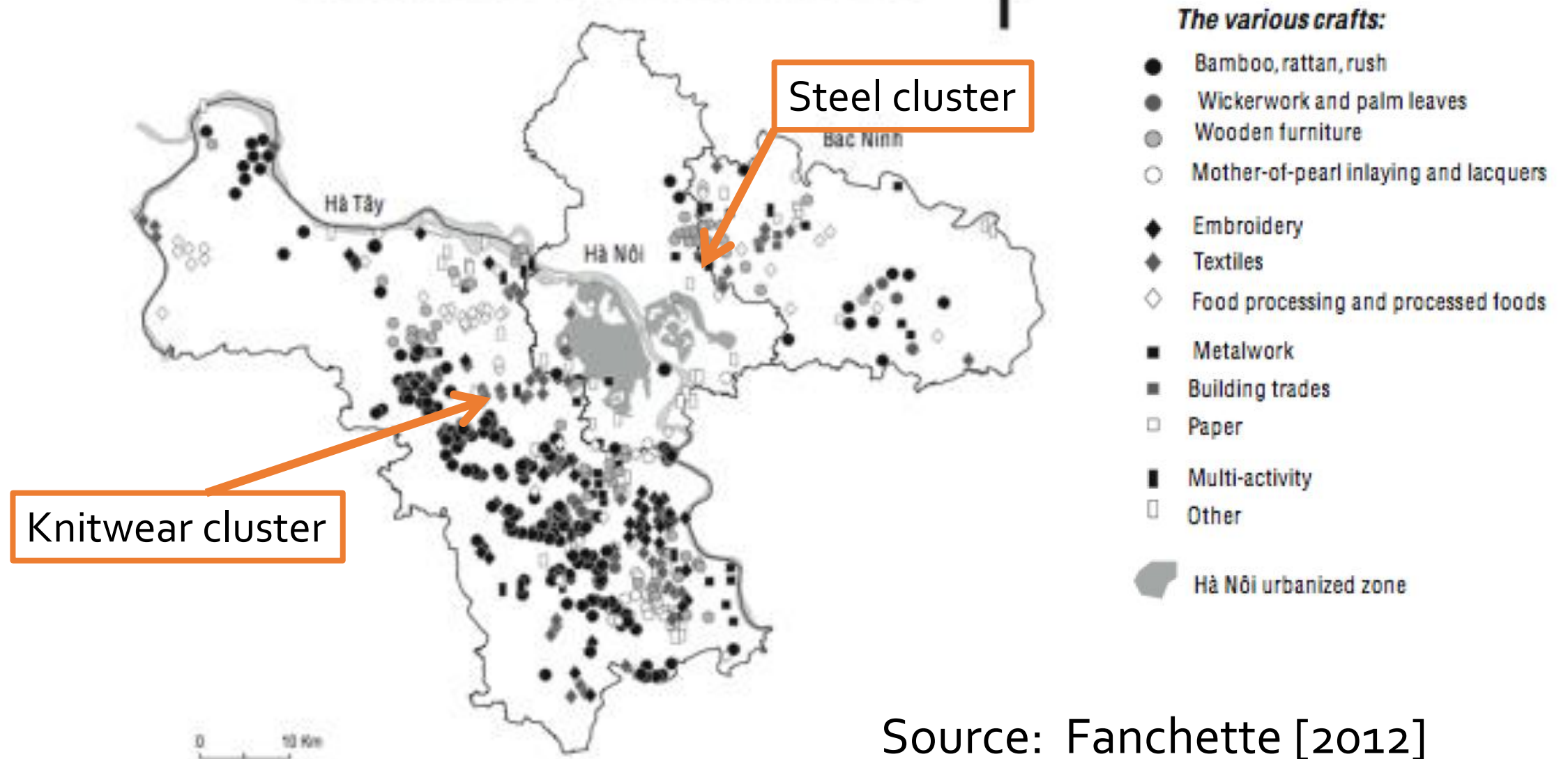
## Results

## Next step

# Study Site

- Over 2,000 village-based industrial clusters all over Vietnam have contributed to economic growth after Doi moi [Oostendorp et al., 2009 WD]
- We focus on two industrial clusters in the suburb of Hanoi: knitwear and construction steel
  - > Heterogeneity to be controlled is relatively small
- We have benchmark information collected by repeated visits and surveys [Nam et al., 2009 JDS; 2010 JCE]

Crafts villages in  
Hà Tây, Hà Nội and Bắc Ninh Provinces in 2006



Source: Fanchette [2012]









# Basic Statistics

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	Knitwear (mean) [median]	Steel (mean) [median]
	<b>N=159</b>	<b>N=153</b>
Years of education	8.1	6.8
Past training experience [=1 if yes]	0.13	0.03
Real sales revenue in 2008 [1,000 USD]	259 [113]	1,767 [1,197]
Real value added in 2008 [1,000 USD]	75 [29]	114 [69]
<b># of employees in 2008</b>	<b>18</b> <b>[8]</b>	<b>20</b> <b>[19]</b>

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# Timeline

- Baseline survey (2010 Jun.)
- Classroom training (2010 Jun. - Sep.)
- Interim survey (2010 Sep.)
- On-site training (2010 Dec. - 2011 Feb.)
- 1<sup>st</sup> follow-up survey (2011 Apr.)
- 2<sup>nd</sup> follow-up survey (2013 Jan.) [Higuchi et al., [2015 JEBO](#)]
- 3<sup>rd</sup> follow-up survey (2016 Jan.)

# Training

## Classroom training

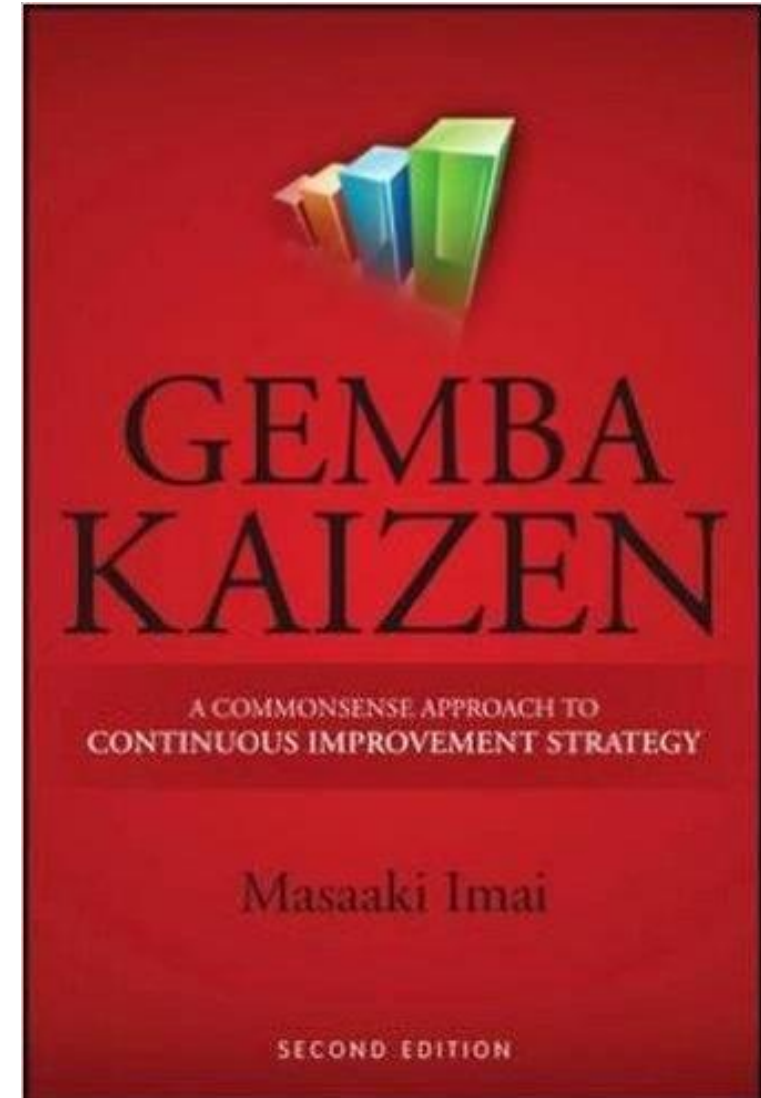
- Lectures and workshop: 40 hours
- ILO module (entrepreneurship, marketing, and record keeping) and production management
- 93 / 197 participated (ITT < TOT)

## On-site training

- Instructors visited each enterprise: half day \* several rounds
- Mostly production management
- 90 / 90 received the consultation (ITT = TOT)

# Training

- Japanese expert of *Kaizen*: Japan-pioneered production management
- Basis of Toyota production system and origin of lean manufacturing
- Common-sense, low-cost, and human-friendly approach (capital investment is not necessarily required)
- Local consultants with ILO's qualification





# Sample Size

Group	Classroom	On-site	Knitwear	Steel
Class + Onsite	Invited	Invited	32	32
Class-only	Invited	Not	57	76
Onsite-only	Not	Invited	16	10
Control	Not	Not	54	35
Total			159	153

TABLE 2—BALANCE CHECK

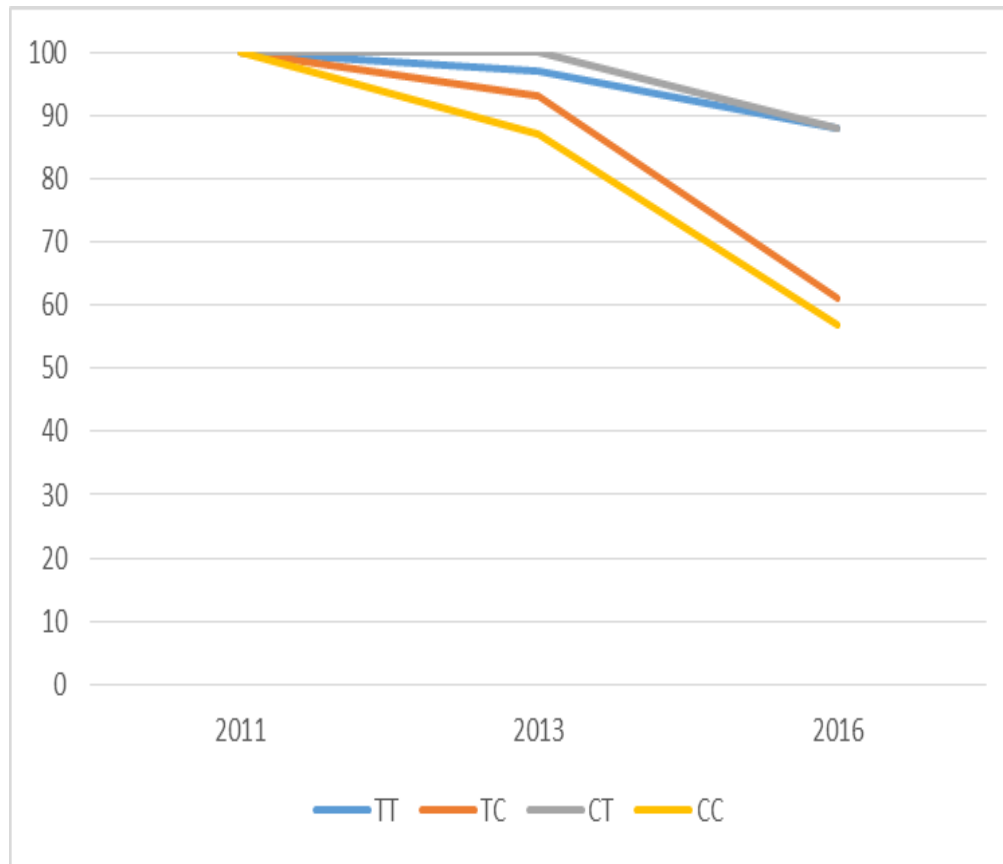
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Steel Class + On-site mean	Steel Class- only mean	Steel On-site- only mean	Steel Control mean	Steel (1), (2), (3) v.s. (4) <i>p</i> -value	Knitwear Class + On-site mean	Knitwear Class- only mean	Knitwear On-site- only mean	Knitwear Control mean	Knitwear (6), (7), (8) v.s. (9) <i>p</i> -value
<i>Panel A: Control variable</i>										
Age	40.19	38.47	38.60	37.74	0.43	38.81	39.19	37.31	39.20	0.80
(as of the baseline)	(6.84)	(7.77)	(7.76)	(8.88)		(8.05)	(9.50)	(8.56)	(11.22)	
Male	0.47	0.43	0.50	0.57	0.21	0.28	0.42	0.44	0.35	0.72
(yes = 1)	(0.51)	(0.50)	(0.53)	(0.50)		(0.46)	(0.50)	(0.51)	(0.48)	
Years of education	6.81	6.79	6.20	7.17	0.43	7.75	7.98	8.63	8.50	0.32
	(2.86)	(2.60)	(2.94)	(3.25)		(2.27)	(2.88)	(3.40)	(3.21)	
Business training experience	0.03	0.01	0.10	0.03	0.92	0.16	0.14	0.25	0.06	0.06
(yes = 1)	(0.18)	(0.11)	(0.32)	(0.17)		(0.37)	(0.35)	(0.45)	(0.23)	
<i>Panel B: Outcome variable</i>										
Baseline Kaizen score	7.25	6.63	6.60	6.17	0.03	3.63	3.58	4.44	3.80	0.76
(0-11)	(1.44)	(1.45)	(1.84)	(1.46)		(1.16)	(1.28)	(2.19)	(1.28)	
Baseline management score	N.A.	N.A.	N.A.	N.A.	N.A.	13.22	12.81	15.25	13.30	1.00
	N.A.	N.A.	N.A.	N.A.		(2.72)	(2.13)	(5.11)	(2.93)	
Baseline employment size	25.19	18.70	22.70	19.37	0.59	18.09	11.74	31.75	22.41	0.33
	(15.88)	(11.88)	(18.26)	(12.43)		(30.50)	(13.97)	(48.35)	(45.58)	
Baseline sales revenue	31,509	25,757	40,529	26,316	0.67	4,094	2,783	5,697	4,340	0.40
	(23,117)	(29,649)	(39,269)	(20,369)		(3,694)	(3,323)	(7,823)	(7,150)	
Baseline value added	1,876	1,690	2,367	1,744	0.89	1,162	733	1,468	1,438	0.25
	(1,505)	(2,425)	(2,195)	(1,641)		(1,393)	(1,121)	(2,615)	(3,496)	
Joint orthogonality <i>p</i> -value					0.54					0.47
No. enterprises in the group	32	76	10	35	153	32	57	16	54	159

# Regression Specification

$$y_{it} = \alpha + \beta^{BOTH}_t Z^{BOTH}_i + \beta^{CLASS}_t Z^{CLASS}_i + \beta^{ONSITE}_t Z^{ONSITE}_i + y_{i0} + \eta_t + \varepsilon_{it}. \quad (1)$$

- $y_{it}$  = outcome variable
- $Z_i = 1$  if invited to our training program (ITT)
- $y_{i0}$  = baseline value of outcome variable (if available) [McKenzie, 2012 JDE]: ANCOVA specification
- $\eta_t$  = time dummies
- $\varepsilon_{it}$  = error term clustered at the enterprise-level
- We also estimate LATE-type specification [Imbens and Angrist, 1994 ECMA]: Replace  $Z_i$  with  $P_i$ , which takes one 1 if participated in training program and use  $Z_i$  as an instrument of  $P_i$

# Survival (Knitwear|Steel)



- 5 year survival rate: 68% in knitwear and 58% in steel cluster
- Information from the exit enterprises (“missing” enterprises in the 3<sup>rd</sup> follow-up survey was only 5 in knitwear and 0 in steel cluster)

# Results (survival)

TABLE 4—TRAINING IMPACT (TWO CLUSTERS POOLED, ITT)

	Sample size	1st follow-up	2nd follow-up	3rd follow-up	<i>P</i> -value equality	<i>P</i> -value all zero
<i>Panel A: Survival (yes = 1)</i>						
Class+Onsite	619		0.13*** (0.049)	0.32*** (0.080)	0.03	0.00
Class-only			0.036 (0.050)	0.17** (0.072)	0.10	0.06
Onsite-only			-0.029 (0.086)	0.29*** (0.10)	0.00	0.00
Control mean			0.84	0.48		

- Class+Onsite had largest impacts in both clusters
- In the knitwear cluster, onsite-only had significant impacts whereas classroom-only did not
- In the steel cluster, class-only had significant impacts whereas onsite-only did not



# Results (value added)

	Sample size	1st follow-up	2nd follow-up	3rd follow-up	<i>P</i> -value equality	<i>P</i> -value all zero
<i>Panel B: Unconditional Value Added (in mil. VND = 50 USD)</i>						
Class+Onsite	931	550.1* (328.5)	483.4** (188.9)	526.5* (342.1)	0.97	0.02
Class-only		119.9 (233.1)	160.5 (133.2)	270.8 (197.6)	0.87	0.39
Onsite-only		235.5 (536.7)	165.6 (240.9)	598.4 (401.1)	0.56	0.47
Control mean		1637.8	696.7	298.2		
<i>Panel C: Conditional Value Added (in mil. VND = 50 USD)</i>						
Class+Onsite	783	557.0* (298.2)	360.1* (197.5)	496.1 (477.0)	0.81	0.09
Class-only		162.9 (203.8)	202.5 (134.8)	416.8 (352.4)	0.82	0.33
Onsite-only		250.1 (500.6)	466.3** (199.3)	761.6 (501.6)	0.74	0.07
Control mean		1637.8	826.0	637.9		

# Results (value added: training pooled)

	Sample size	1st follow-up	2nd follow-up	3rd follow-up	<i>P</i> -value equality	<i>P</i> -value all zero
<i>Panel B': Unconditional Value Added (in mil. VND = 50 USD)</i>						
Training (any)	931	252.9 (219.9)	250.3** (120.6)	381.0** (189.7)	0.83	0.04
Control mean		1637.8	696.7	298.2		
<i>Panel C': Conditional Value Added (in mil. VND = 50 USD)</i>						
Training (any)	783	283.8 (196.2)	276.0** (123.0)	491.2 (330.8)	0.81	0.06
Control mean		1637.8	826.0	637.9		

# Robustness (value added)

- In log-like transformation
- Winsorizing/trimming top 1/5 percent
- Controlling for record keeping score
- Randomization inference

# Management Score

*Kaizen* score [Higuchi et al. 2015]

- Information on adopted production management practices
- Based on 11 yes/no diagnostic criteria
- Enumerators' visual inspection and/or entrepreneurs' response

McKenzie and Woodruff (MW) score [[2016 Management Science](#)]

- Information on adopted marketing, procuring, record keeping, and financial planning practices
- Based on 26 yes/no diagnostic criteria
- Entrepreneurs' response

# *Kaizen Score*

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Based on the enumerators' observation

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The enterprise has a designated area for each production/activity within the workshop.

The enterprise has a fixed place where major tools are stored.

The storage of tools is put in order by kinds.

The enterprise has a fixed place where raw materials are stored.

The raw materials are stored separately from the scrap.

The work flow line is determined.

The defectives of raw materials and finished products are clearly segregated from good ones.

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Based on the owners' response

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The scraps are removed and the floor is cleaned every day.

The workers maintain machines every day.

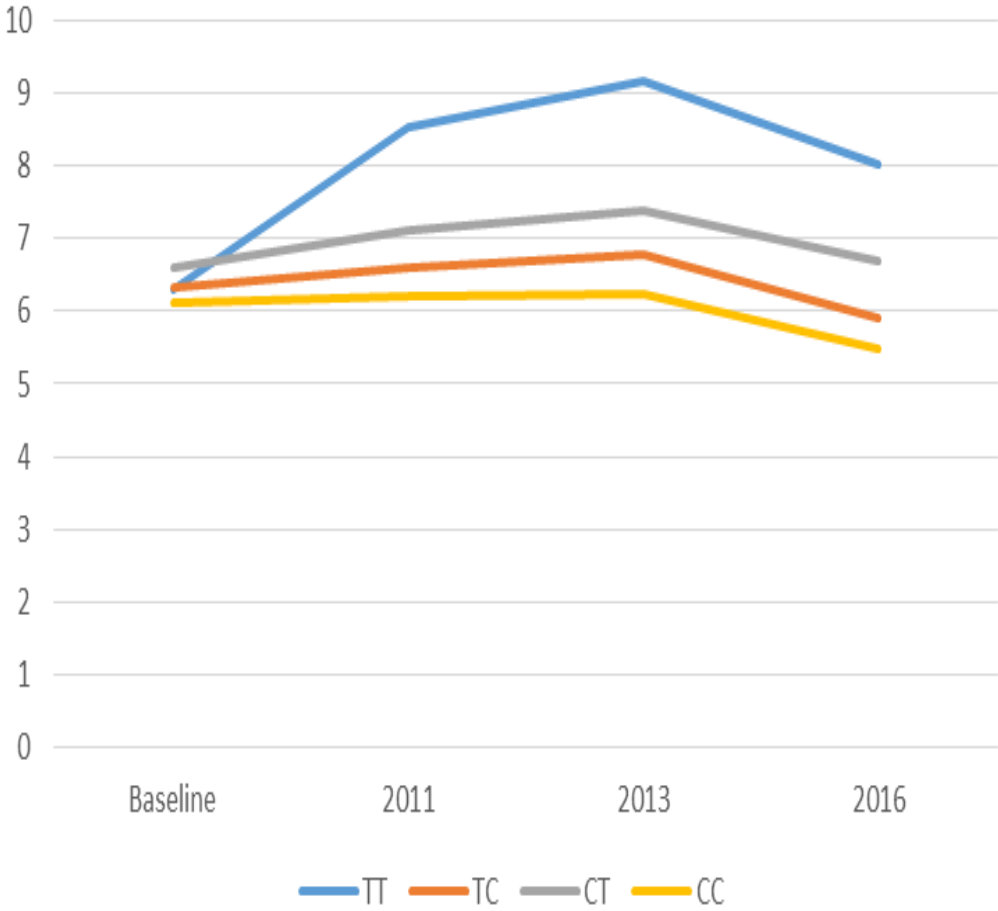
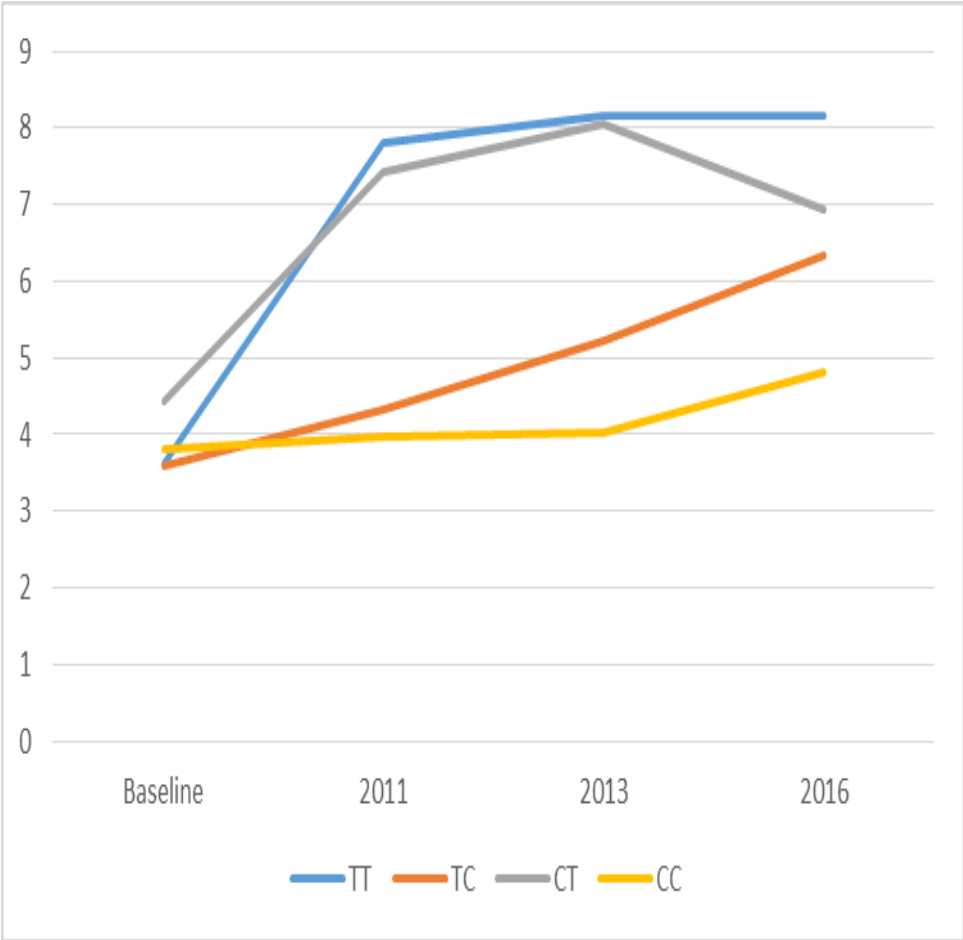
The enterprise holds meeting in which all workers participate.

The proprietor knows how long each production process takes.

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# Management Score (Knitwear|Steel)



# MW Score (only in 2016)

Group	Knitwear (mean)	Knitwear [median]	Steel (mean)	Steel [median]
Class + Onsite	12.4	[12.5]	8.0	[6.5]
Class-only	8.3	[9.0]	7.1	[6.0]
Onsite-only	11.0	[7.5]	7.3	[6.5]
Control	5.7	[6.0]	7.4	[6.0]
Total	9.0	[7.5]	7.4	[6]

# Entrepreneurial Mindset

- Bruhn et al. [2017 JPE] find that consultation services increased entrepreneurial spirit as well as employment and TFP among Mexican SMEs
  - “entrepreneurial spirit index was constructed using a number of questions we asked owners/managers about their confidence in their management skills and their ability to grow their firm and handle difficulties”
- Campos et al. [2017 Science] find that psychology-based personal initiative training had bigger impacts than conventional business training among Togolese microentrepreneurs
- Lafortune et al. [2016 mimeo] find that motivational intervention (introduction of role model) had impacts among Chilean microenterprises

# Entrepreneurial Score (0-7)

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The entrepreneur is definitely willing to learn business/management.

The entrepreneur invited external advisor/consultant/monitors to the workshop in 2015.

The entrepreneur visited foreign county for business-related activities in 2015.

The entrepreneur has a plan to introduce new product or upgrade the quality of current product.

The entrepreneur is confident in training and communicating with workers to produce new or higher quality product.

The entrepreneur introduced a new product or upgraded the current product.

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# Entrepreneurial Score (only in 2016)

Group	Knitwear (mean)	Knitwear [median]	Steel (mean)	Steel [median]
<b>Class + Onsite</b>	<b>3.4</b>	<b>[3.0]</b>	<b>2.0</b>	<b>[2.0]</b>
Class-only	1.3	[1.0]	1.6	[1.0]
Onsite-only	2.8	[2.5]	1.0	[1.0]
Control	0.8	[1.0]	1.0	[1.0]
Total	1.2	[2.0]	1.6	[1.0]

# Real-world Behavior

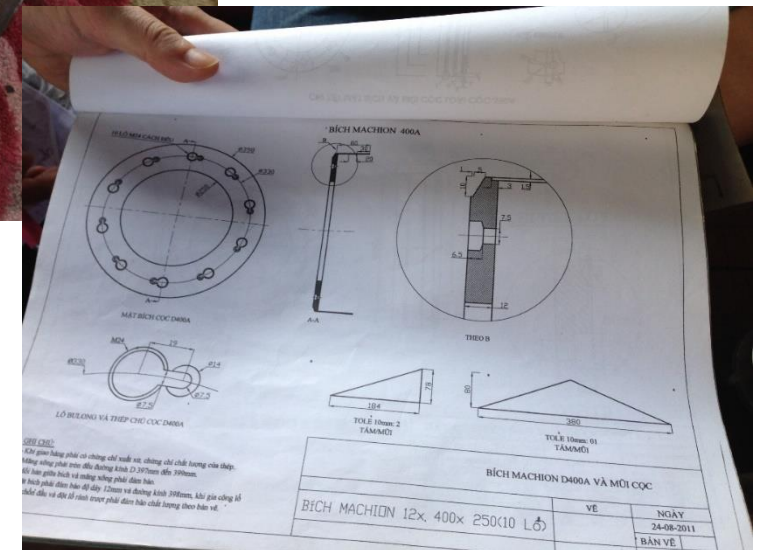
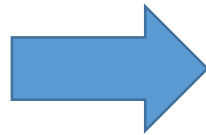
## Participation in NGO's management training

- An international NGO provided management training in the knitwear cluster
- According to our interview, they invited relatively large enterprises on mouth-to-mouth basis and did not systematically targeted (excluded) our training participants
- 17 (15 are treated) enterprises participated (significant at 10% in regression)

## Product upgrading

- 17 (14 are treated) enterprises introduced new product by investing in machine and changing material supplier and sub-contractor (significant at 10% in regression)

# Product Upgrading



# Results (mechanism)

	Sample size	1st follow-up	2nd follow-up	3rd follow-up	<i>P</i> -value equality	<i>P</i> -value all zero
<i>Panel D: Kaizen Score (0-11)</i>						
Class+Onsite	780	3.238 (0.245)	3.639 (0.212)	2.523 (0.360)	0.00	0.00
Class-only		0.643 (0.221)	0.992 (0.221)	0.811 (0.339)	0.04	0.00
Onsite-only		2.407 (0.265)	2.990 (0.257)	1.449 (0.381)	0.00	0.00
Control mean		4.85	4.87	5.18		
<i>Panel F: Entrepreneurial Spirit (0-7)</i>						
Class+Onsite	504	0.534 (0.070)		2.027 (0.212)	0.00	0.00
Class-only		0.250 (0.058)		0.720 (0.188)	0.01	0.00
Onsite-only		0.272 (0.098)		1.447 (0.272)	0.00	0.00
Control mean		0.10		0.89		



# Summary

- If properly designed, business training has long-term impact on firm performance
- The combination of classroom and on-site training worked best
  - ✓ Quantity of training matters
  - ✓ Production management (*Kaizen*) component is most likely useful
- > More research on training content and duration is warranted

# Next Step (Vietnam)

Training by local consultants in a bedding cluster to address the issue of scalability

- Training by local trainers had weaker impacts than training under close supervision of international researchers [Berge et al., 2012 *J Af E*; Fischer and Karlan, 2015 *AER PP*]

Teaching only *Kaizen* to analyze its pure impact

- Our previous training had mixed components



# Next Step (Malaysia)

6-month intensive training to vendors of Japanese transportation and/or electronic equipment manufacturers

Treated=50, Control=100, and “indirect-T”=100

We will evaluate

- training impact on enterprises (management and business)
- training impact on workers (including stress measure using biomarker)
- spillover effect on upstream (and downstream) firms

# Supply chain network

