



*cutting through complexity*



the sustainable  
trade initiative



# Business case analysis for responsible electronics manufacturing

5 March 2013

Public Report



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This report has been produced by KPMG, together with IDH and INFACT



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IDH accelerates and up-scales sustainable trade by building impact oriented coalitions of front running multinationals, civil society organizations, governments and other stakeholders. Through convening public and private interests, strengths and knowledge, IDH programs help create shared value for all partners. This will help make sustainability the new norm and will deliver impact on the Millennium Development goals.



## INFACT

INFACT Global Partners is a leading provider of corporate social performance solutions. Our mission is to help companies implement supplier performance programs that achieve the responsible balance between maximizing financial return and meeting supplier responsibility requirements.



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To the reader,

You are reading a report of a study commissioned by the IDH Sustainable Trade Initiative (IDH). We appreciate the opportunity to have conducted this study for IDH. In this study we collaborated with INFACIT, a consultancy focusing on improving social performance in Chinese manufacturing.

### **Structure of this report**

We provide you with our key findings and recommendations in the executive summary. After this, we explain the research methodology, including the ‘mental model’ employed and the design of the custom-built Excel model that has driven our business case analysis. We then outline the outcomes of our business case analysis, and provide you with an overview of the underlying evidence that has formed the input for the analysis. We finish our report with a number of recommendations to IDH and its partners.

### **Background to the IDH Electronics programme**

IDH has an established impact-oriented programme aimed at improving social and environmental performance of electronics suppliers in China by focussing on capacity building, going beyond compliance, and promoting worker-management dialogue to facilitate a process of continuous improvement.

### **Objective of this project**

Electronics suppliers are often reluctant to invest in working conditions, as they see such investments as ‘cost-only’. The objective of this project has been to analyse the business case for investing in improving working conditions in the electronics manufacturing industry in the Pearl River Delta (PRD), China. While KPMG acknowledges that there are several reasons for investing in working conditions, including moral ones, the focus of our research has been on the business benefits from a supplier point of view.

### **Limitations**

KPMG is well aware that: (1) the effects of investing in workers are influenced by a large number of factors that are internal and external to the suppliers being considered in this study; (2) interventions in working conditions should not be seen in isolation; (3) the effects of interventions are difficult to predict and/or capture in a linear relationship between the intervention and its impact. Bearing this in mind, we have relied on available literature, analysis of limited datasets and an interview programme to estimate the effects of a range of interventions.

Figures used as input for our model should be treated as strictly indicative, as should the outcomes.

This report should be seen as a conversation starter on the business benefits for suppliers of investing in working conditions, and an open invitation to suppliers, brands, academics, and consultants to contribute to this conversation their expertise on the relationship between investing in working conditions and suppliers’ bottom line.

### **Important notice**

This report is exclusively drawn up for the purpose of a business case analysis of investing in working conditions in electronics manufacturing in China, commissioned by IDH and for no other purpose. KPMG Advisory N.V. (“KPMG”) does not guarantee or declare that the information in the report is suited for the objectives of others than IDH. This means that our report cannot replace other investigations and/or procedures that others than IDH may (or should) initiate with the objective to obtain adequate information about matters that are of interest to them, or for any other purpose in connection with their decision making and/or advise to their clients. It is not the responsibility of KPMG to provide information to any third party that has become known or available at any time after the date of the report.

KPMG accepts no liability for the report towards any others than IDH. The terms and conditions of the agreement under which this report has been drawn up are exclusively governed by Dutch law, and the court in the district within which the office is situated has exclusive jurisdiction with respect to any disputes arising under or in connection with that agreement.

The reader should be aware that this study is based on a modelling exercise, which is necessarily a simplified version of reality. This study does not claim to provide a definitive conclusion on the business case of investing in working conditions. It is important to further develop the knowledge base going forward.

Yours sincerely,

KPMG Advisory N.V.

Bernd Hendriksen

Partner

## Investing in working conditions by Chinese electronics suppliers makes business sense...

- Investments in working conditions can pay for themselves through productivity improvements, with pay-back periods ranging from 4-20 months, and margin improvements of up to 0.4%, which is significant given typical net margins of 1%-2%
- Focused investments with a direct impact on rework and worker productivity provide the most attractive pay-back periods
- At the same time, worker-management dialogue is likely to facilitate operational efficiency improvements and is likely to have a broad and durable impact on margins, although the pay-back period may exceed typical contract timelines
- Investing in workers reduces worker turnover, which can form the first step in a positive cycle of worker engagement, up-skilling and higher value-add per worker
- Further incentives for investing in working conditions could come from brands, however they currently do not structurally penalise suppliers that underperform on working conditions, or reward those that outperform

## Building on these findings, we suggest...

- Suppliers to recognise that investments in workers can pay for themselves through positive and durable productivity effects, and to pro-actively explore which investments are most promising in their context
- Brands to provide incentives for suppliers that improve social performance, and engage with suppliers to create the necessary conditions for longer term investments with pay-back periods that exceed the typical 12-18 month contracting horizon
- IDH to facilitate brand-supplier dialogue and invite stakeholders to build the knowledge base around the business benefits of investing in working conditions

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# Methodology

## Overview of approach, analyses, data sources

**Longlist of hypotheses**  
(academic papers & team analysis)

**Shortlist of hypotheses & design of mental model <sup>(1)</sup>**

### Analysis of relationships between investing in working conditions & productivity

#### Literature review

- 99 academic papers, case studies and articles

#### Interview programme

- Suppliers (4)
- Brands (4)
- Experts (4)

#### Regression analysis

- IDH programme KPIs from 10 suppliers
- IDH worker surveys from 20 suppliers
- KPIs from 47 China-based suppliers

**Business case calculation based on typical supplier profit tree <sup>(1)</sup>**

## Comments

- A rigorous process has been followed to derive and test hypotheses on the relationships between interventions in working conditions and productivity
- Analysis of academic studies, interviews and regression analysis of raw data has been used to derive linear relationships to describe the impact of potential interventions taken by suppliers
- These impacts have been fed into a business case in a custom-built Excel-model to calculate interventions' impact on the bottom line of suppliers

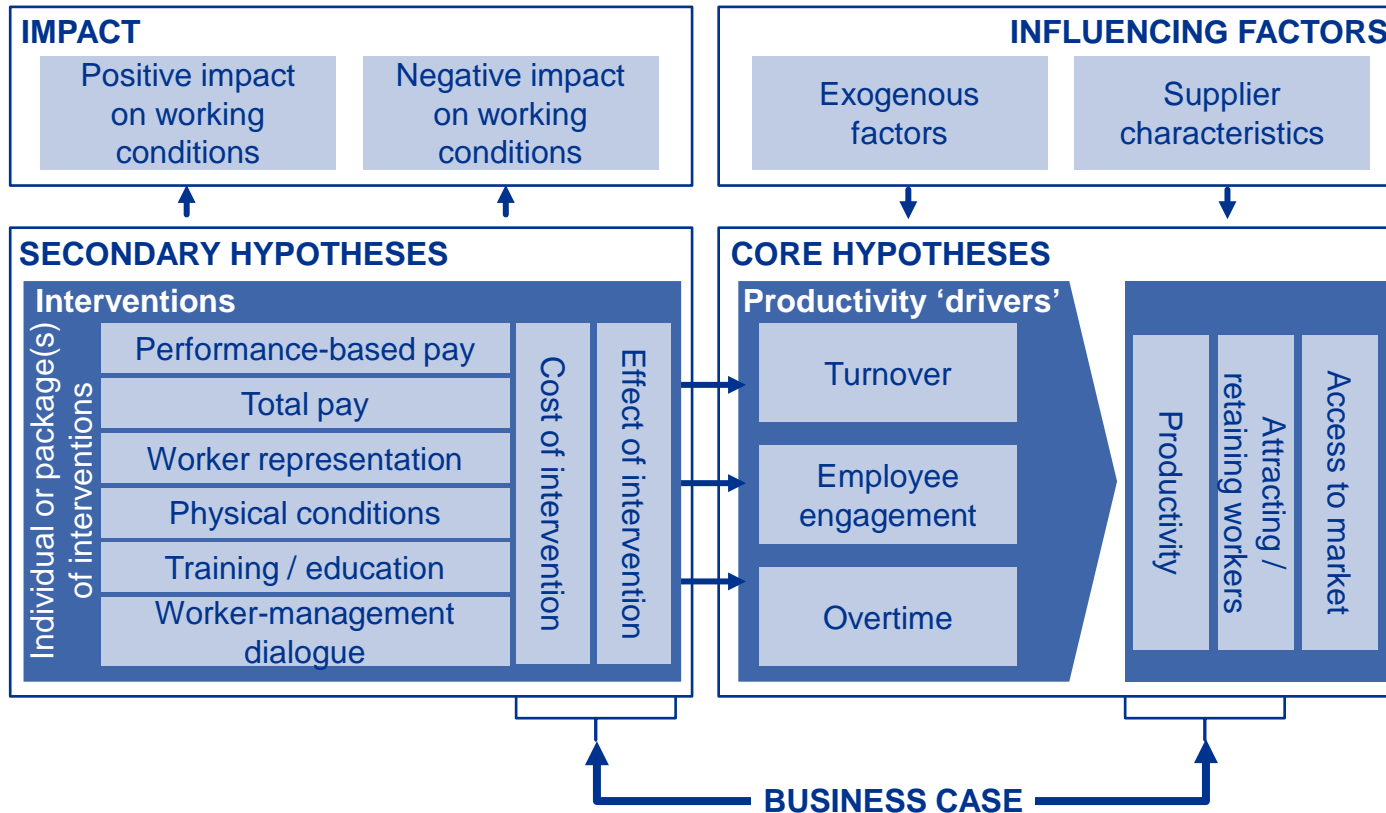
Note:

(1) See Mental Model on page 7, Profit tree on page 8 and Appendices 2 and 3 for full explanation

# Methodology

## Mental model

### Overview of mental model approach



### Comments

- The diagram represents our approach to the project and business case analysis
- Our core hypotheses contain the relationships between specific productivity drivers (turnover, employee engagement, overtime) and productivity, which influences the competitiveness of suppliers
- These 'drivers' are in turn affected by specific interventions aimed at improving working conditions
- A business case exists if the cost savings from the intervention outweighs the costs, over time

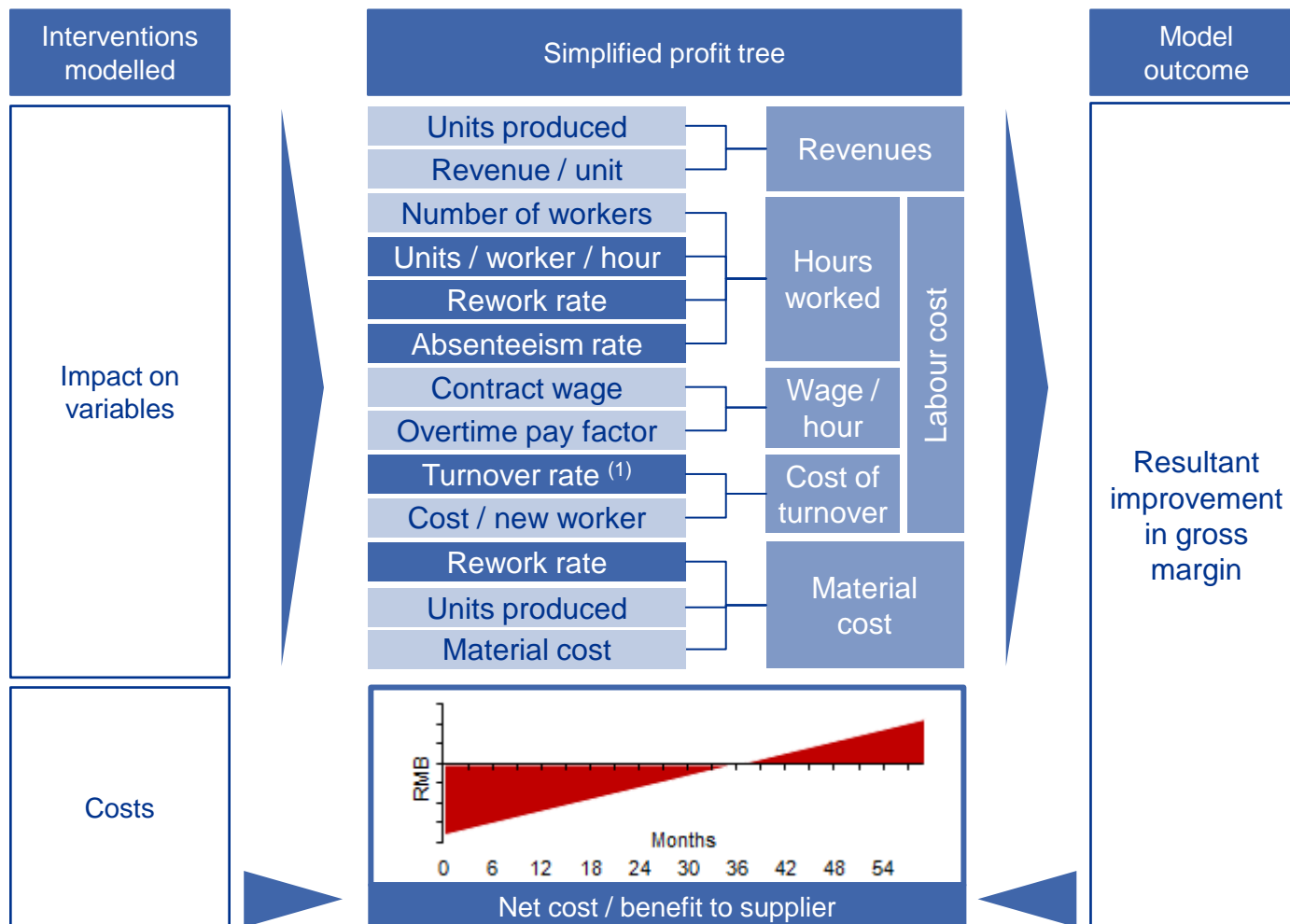
Note: See Appendices 2 and 3 for full explanation of the mental model



# Methodology

## Model structure

### Overview of model structure



### Comments

- The diagram represents a simplified overview of the custom built Excel-model
- The core of the model is formed by a 'profit tree' that represents the profit model of an archetypical electronics supplier
- Gross margin is assumed at ca 12%, with labour accounting for 5% of cost of goods sold, and material costs the remainder
- Four key productivity variables in the profit tree are affected by the modeled interventions
- The costs associated with the intervention (one-off and/or recurring) and the resultant improvement in gross margin determine the business case
- Interventions are modelled with a lag time to acknowledge that the effects are not instant
- For all assumptions see p29

#### Key

Variables shown in simplified profit tree:

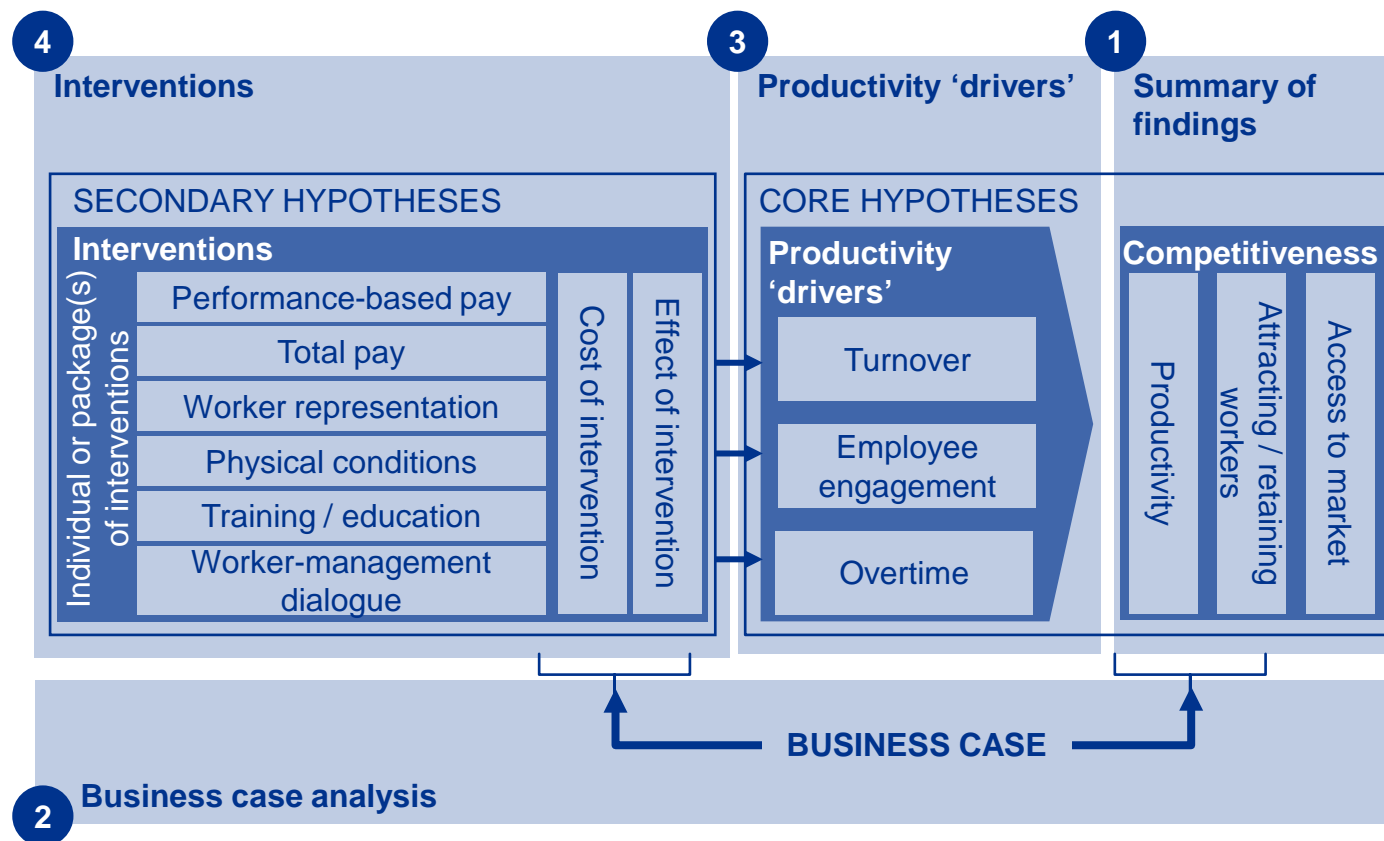
- Held constant
- Varied according to modeled intervention

Note: (1) A reduction in turnover is also modeled to have a secondary impact of improving average worker productivity and reducing the rework rate

# Methodology

## Report structure

### Overview of approach, analyses, data sources



### Comments

- As shown on the left, the mental model is used to structure this report
- First we outline the summary of findings and how they relate to competitiveness (1)
- We then explain the outcomes of our business case modeling and the inputs that have driven this analysis (2)
- Next we provide an overview of the underlying evidence for the core and secondary hypotheses, looking at the productivity drivers and interventions (3) and (4)
- Finally we give specific recommendations to improve the business case moving forward

# Key findings

### Investing in working conditions can improve margins and increase competitive advantage

### Comments

#### Observations

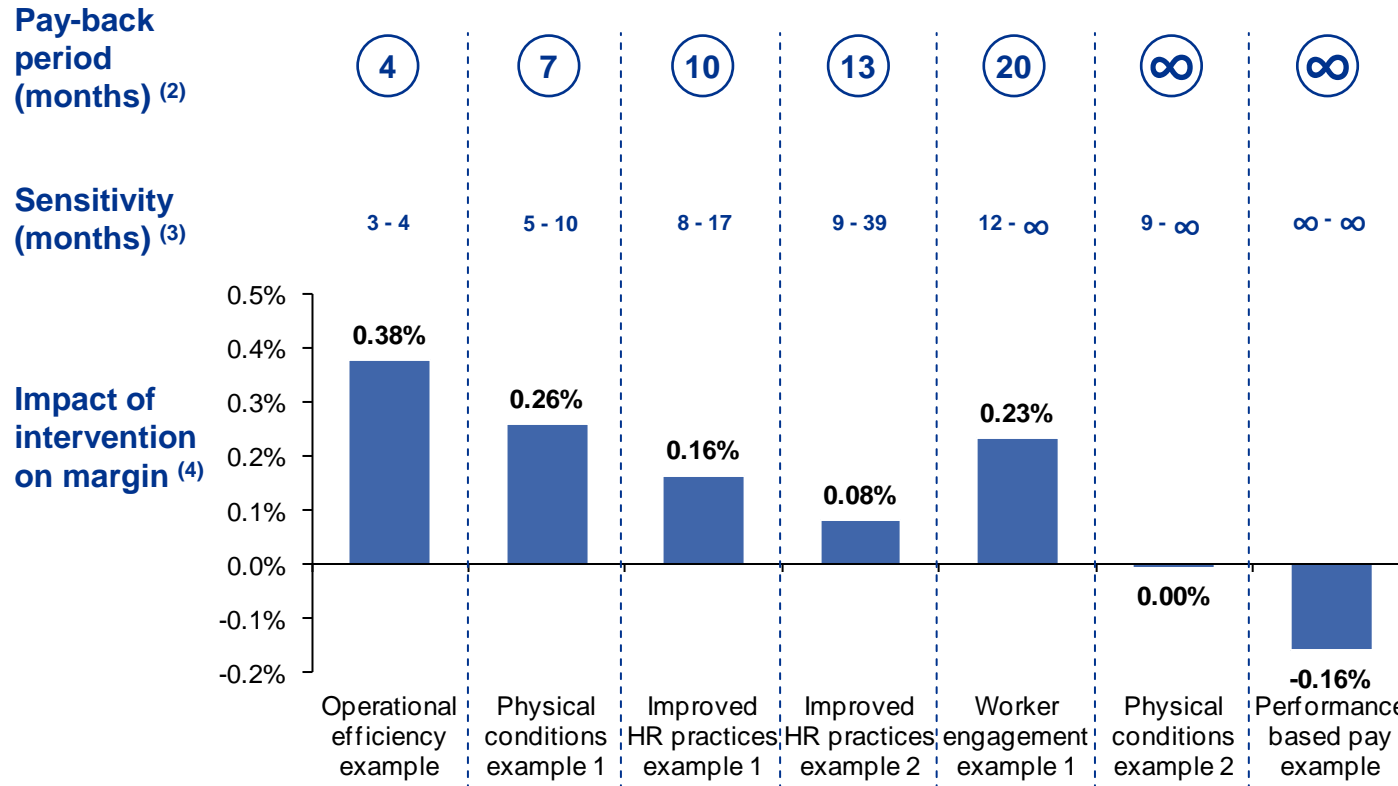
Productivity improvements	<ul style="list-style-type: none"> <li>• Our research has derived a number of quantified relationships between working conditions and productivity (see p13)</li> <li>• For a number of interventions, an attractive pay-back period ranging from 4-20 months can be realised, which improves net margin by 0.08%-0.38%, which is significant in a sector with typical net margins of 1%-2%</li> <li>• Having open communication with workers is likely to strengthen the effect of interventions and make them more durable</li> <li>• Suppliers may also benefit from fewer disruptions to production resulting e.g. from labour strikes, however this has not been included in our analysis</li> </ul>
Attracting / retaining workers	<ul style="list-style-type: none"> <li>• Labour shortages in China are likely to continue increasing, making attraction / retention of workers more important (IMF, 2013)</li> <li>• Attracting and retaining younger workers requires a more comprehensive approach to working conditions as they are not just focused on hours and pay but also on leisure, physical conditions, training, and achieving their dreams among other things (EICC 2012; Gallagher 2012; KPMG interview programme 2013)</li> <li>• Several of the interventions examined result in decreases in turnover</li> </ul>
Access to markets	<ul style="list-style-type: none"> <li>• Achieving compliance and certification does not necessarily translate into more business (Oka, 2012; Locke, 2009)</li> <li>• Brands appear reluctant to discontinue relationships with suppliers in breach of standards as they prefer to engage and build suppliers' capacity, although some brands indicate an intention to take a stricter stance on this going forward, increasing the risk of losing contracts for suppliers that are not in control of working conditions (KPMG interview programme 2013)</li> <li>• Brands appear unlikely in their contracting to favour suppliers that score well on working conditions, but appear willing to co-invest with suppliers that are pro-active in this area (KPMG interview programme 2013)</li> </ul>

- There is strong evidence to support the notion that investing in working conditions (interventions) improves productivity
- Investing in workers makes business sense under the right conditions, with a number of interventions showing pay-back periods ranging from 4-20 months
- Worker-management dialogue and operational efficiency can be done separately, but appear stronger when done together
- Worker-management dialogue can create the conditions for operational efficiency / Lean
- Operational efficiency can provide the headroom to make further investments in working conditions, enabling a positive productivity cycle
- Attracting and/or retaining workers is a key aspect of this positive cycle, which can contribute to competitive advantage

# Key findings

## Business case analysis – Outcomes

Impact of selected interventions on bottom line <sup>(1)</sup>



Please note: these example interventions are illustrative and are **not** intended to be **representative** of the interventions done in the context of the IDH Programme

Comments

- The analysis shows the pay-back period as well as the margin impact of the various interventions, taking into account both the resultant improvements in productivity and the costs of the interventions
- Several interventions have attractive pay-back periods, ranging from 4-20 months and a margin increase of 0.1%-0.4% which is significant as typical net margins range from 1%-2%
- Focused interventions that have a direct impact on rework or worker productivity, like 'Operational efficiency' and 'Physical conditions 1' appear the most attractive
- More comprehensive HR / WMD packages require longer pay-back periods, which may indeed exceed the typical 12-18 month contracting timeline
- We have only been able to model the turnover effects of performance-based pay, which does not yield a business case <sup>(5)</sup>

Note: (1) Only the interventions for which we were able to derive a quantifiable linear relationship with productivity are shown here  
 (2) For some interventions, the costs outweigh the benefits and there is no pay-back period, which is denoted as 'infinity' or ∞  
 (3) Sensitivity analysis performed shows the minimum / maximum pay-back periods derived by improving / worsening the intervention's costs and impact by 25%  
 (4) Shown here is the margin impact after the intervention has taken effect, i.e. after the lag time. It is assumed that overheads not impacted by the interventions modeled, such that the net effect of the change in gross margin and the costs of the intervention translate into a net margin impact  
 (5) For performance-based pay we were only able to derive a quantifiable relationship with turnover; adding in potential productivity effects would improve the business case

# Key findings

## Business case analysis – Inputs

2

### Overview of key inputs used (indicative)

Factory characteristics – Typical factory in the IDH Programme					
KPI	Value	Unit	KPI	Value	Unit
Number of workers	2000	#	Worker turnover	15%	% / month
Number of units produced	2.3	# million / month	Cost of recruitment	2,220	RMB / worker
Productivity	5.0	Units / worker / hour	Rework rate	3%	% of units
Gross wage <sup>(1)</sup>	1,800	RMB / month	Revenue per unit	60	RMB
Average hours workers	55	Hours / week	Material cost per unit	50	RMB

Interventions modelled						
	Category	Action	Impacted variable	Change	Lag time (mo.) <sup>(2)</sup>	Cost <sup>(3)</sup>
Individual interventions	Performance pay	Introduce performance-based pay / bonus system	Turnover	Decrease 36%	2	RMB 273
	Physical conditions 1	Improve comfort in factory through air conditioning and heat-shields on machinery	Rework rate	Decrease 65%	2	One-off: RMB 900
	Physical conditions 2	Hire ergonomics specialists to prevent absenteeism resulting from sickness and doctor visits	Absenteeism	Decrease 53%	2	RMB 14
	Operational efficiency	Perform intensive / focused lean manufacturing diagnostic; the gains can be re-invested in workers	UPPH	Increase 10%	2	One-off: RMB 277
Package of interventions	HR practices	Package including better recruitment, formal training, better information, performance appraisal	Turnover	Decrease 40%	6	RMB 70
	Worker-management dialogue 1	Package includes training of management on WMD, promoting worker involvement, improving worker welfare, and worker-driven operational efficiency	Turnover, UPPH, rework	Decrease 10% Increase 10% Decrease 10%	6	RMB 280 + One-off: RMB 647
	Worker - management dialogue 2	Improve relationship between workers and supervisors by increasing the ratio of supervisors to workers and investing in HR staff	Turnover	Decrease 25%	6	RMB 58

Note: (1) Gross wage consists of RMB 1,400 basic wage and a RMB 450 fixed cost in the form of housing allowance and social insurance payments

(2) Lag time is modeled to reflect the fact that the effect of interventions will not be instant, with 6 months modeled for the more comprehensive packages aimed at employee engagement, and two months for the other interventions

(3) Cost is the cost per worker per month in RMB, except where it is specified to be 'one-off'

### Comments

- The factory characteristics represent a typical supplier in the IDH Programme
- The inputs used to describe the effect of the interventions are strictly indicative, and are based on a triangulation of the evidence found during the course of our engagement
- While there was strong support for the business benefits of a broad range of interventions, quantifiability of these effects has been limited to a smaller selection of interventions
  - Quantifiability requires the data analysed to meet a range of statistical tests for expressing a linear relationship between two variables (see also p23)
- For a more detailed overview of the evidence used to generate these inputs please see p24-26

Please note: these example interventions are illustrative and are *not* intended to be *representative* of the interventions done in the context of the IDH Programme

# Key findings

## Evidence – Productivity drivers

### Overview of findings and strengths of productivity drivers

Productivity Driver	Observations	Strength of evidence <sup>(1)</sup>	Quantifiability <sup>(1)</sup>
Turnover	<ul style="list-style-type: none"> <li>A negative correlation between turnover and productivity/profitability/perceived impact on growth exists</li> <li>New workers have lower productivity. One supplier stated that productivity per worker is 20% less and rework is double that of more experienced workers. This would suggest a 0.03% increase in UPPH and a 0.13% decrease in rework for every percentage decrease in turnover</li> </ul>		
Employee engagement	<ul style="list-style-type: none"> <li>'Contentment' is a strong predictor for rework, but this could not be quantified as it was taken from a qualitative survey</li> <li>Worker engagement is a broad concept, the effects of which are difficult to measure in isolation</li> <li>However, evidence around 'worker-management dialogue' does show positive impacts on productivity, and it is likely that employee engagement plays a role in this</li> </ul>		
Overtime	<ul style="list-style-type: none"> <li>A band of optimum overtime exists: too much and productivity decreases, too little and worker turnover increases</li> <li>Overtime has a negative impact on productivity (UPPH and rework)</li> </ul>		

### Comments

- Reducing turnover and overtime reduces costs by improving worker productivity and reducing rework
- Turnover reduction is a key priority for suppliers' competitiveness in a context of labour shortages, as turnover results in the cost of recruiting and training new workers, and contributes to skill dilution, while new workers also have lower productivity and more rework

<u>Key</u>	Support:	Quantifiability:
	> 6 cases	> 1 relationship
	4-6 cases	= 1 relationship
	<4 cases	no relationship

(1) Refers to the evidence considered in the course of this study and does not represent an exhaustive inventory. See summary slide in Appendix (p19) for more detail

### Overview of findings and strengths of interventions

Intervention	Priority	Observations	Strength of evidence <sup>(1)</sup>	Quantifiability <sup>(1)</sup>
Performance-based pay	●	<ul style="list-style-type: none"> <li>Performance-based pay positively impacts productivity, although we've only been able to quantify the impact on reduced turnover</li> <li>High priority for suppliers as it can reduce turnover and improve productivity; high priority for workers as it can increase overall earnings</li> </ul>	●	◐
Total pay	●	<ul style="list-style-type: none"> <li>Higher pay can attract and retain workers and thus reduce turnover</li> <li>Key for workers; they volunteer for overtime to obtain a higher total pay</li> </ul>	●	◐
Worker representation	◐	<ul style="list-style-type: none"> <li>Suppliers report difficulties in implementation</li> <li>Low priority for suppliers and brands</li> </ul>	◐	◐
Physical conditions	◐	<ul style="list-style-type: none"> <li>Supplier examples show that improving worker welfare (e.g. installing air conditioning) improves performance (quality), reduces worker complaints, and reduces turnover</li> </ul>	●	●
Training/ education	◐	<ul style="list-style-type: none"> <li>Improves productivity, reduces health &amp; safety incidents and can increase retention</li> </ul>	●	◐
Worker-management dialogue	◐	<ul style="list-style-type: none"> <li>Improving working relationships can lead to process improvements, increased morale, and productivity increases</li> </ul>	●	●
HR practices <sup>(2)</sup>	N/A	<ul style="list-style-type: none"> <li>Companies with strategic / advanced HR practices experience decrease turnover and/or higher productivity</li> </ul>	◐	◐
Health & safety <sup>(3)</sup>	●	<ul style="list-style-type: none"> <li>Suppliers aim to decrease incidents to reduce absenteeism rates and thus improve productivity</li> </ul>	N/A	N/A
Operational efficiency <sup>(2)</sup>	N/A	<ul style="list-style-type: none"> <li>Suppliers report profitability and employee motivation improvements from efficiency gains</li> <li>Operational efficiency reduces overtime, and gains can be invested in working conditions, such as higher pay</li> </ul>	◐	●

(1) Refers to the evidence considered in the course of this study and does not represent an exhaustive inventory. See summary slide in Appendix (p19) for more detail

(2) HR practices and Operational efficiency were not included in the interview questions regarding priority

(3) Health & safety was not included in our analysis as the accident rate in the electronics sector is relatively low and poorly recorded

### Comments

- Investing in working conditions has a positive impact on productivity, indirectly through reducing turnover or directly by increasing worker productivity, or reducing rework
- Pay and health and safety are the highest priority areas for investments, while worker-management dialogue represents the most comprehensive approach to improve working conditions and is likely to have the broadest and most durable impact
  - Analysis of the IDH worker survey data suggests that interventions like performance-based pay are more effective in a context of open communication

#### Key

Priority:	Strength:	Quantifiability:
High ●	> 6 cases ●	> 1 relationship ●
Mixed ◐	4-6 cases ◐	= 1 relationship ◐
Low ◐	<4 cases ◐	no relationship ◐



# Key findings

## Recommendations

### How to further build the business case for investing in working conditions

Party	Recommendations
<b>IDH</b>	<ul style="list-style-type: none"> <li>• Improve data collection and analysis               <ul style="list-style-type: none"> <li>• Reconsider KPIs and Worker Survey questions in light of the relationships you want to analyse to ensure that the data results are meaningful and the format of the data supports statistical analysis that meets the criteria for linear relationships</li> <li>• Collect baseline KPI data to measure effect of IDH programme</li> <li>• Look for more relative measures for worker productivity (e.g. deviation of target from actual) and rework (e.g. in relation to takt time) in order to support analysis across suppliers</li> </ul> </li> <li>• Improve the understanding of the costs involved in investing in working conditions</li> <li>• Build the knowledge base by inviting academics, consultants, brands and suppliers to contribute their expertise               <ul style="list-style-type: none"> <li>• Best practice examples (intervention, cost, impact, outcome)</li> <li>• Statistically significant and quantifiable relationships between interventions and productivity improvements, including costs for the interventions</li> <li>• Contributors should specify the context in which these findings apply</li> </ul> </li> <li>• Facilitate the dialogue between suppliers and brands that can result in a cooperative approach towards investing in working conditions (see also below)</li> </ul>
<b>IDH partners</b>	<ul style="list-style-type: none"> <li>• Suppliers should recognise that investments in workers are not 'cost-only' and can pay for themselves through positive and durable productivity effects; they should pro-actively explore which investments are most promising in their context</li> <li>• Suppliers should acknowledge that investing in working conditions can have positive productivity effects and should not present such investments as 'cost-only'</li> <li>• Brands should engage more pro-actively with suppliers to provide the security to invest in working condition interventions with a pay-back period of longer than the contract cycle that typically spans 12-18 months</li> <li>• Brands should provide incentives for suppliers that out-perform in the area of working conditions (and on environmental parameters), for example by offering favourable conditions or an increase 'share of wallet'</li> <li>• Brands should leverage their Lean manufacturing expertise to promote a positive cycle of improved working conditions and operational efficiencies, while ensuring that worker involvement forms an integral aspect of this process</li> </ul>

### Comments

- There is much to be gained from a more collaborative approach between brands and suppliers in facilitating investments in working conditions
- IDH can facilitate the requisite dialogue
- Furthermore, IDH can strengthen the business case by expanding the knowledge base that shows how investments in worker result in productivity improvements, as a more comprehensive set of datapoints will enable IDH to better 'predict' the likely outcome depending on the specific supplier context
- One option for this would be to develop a 'wikipedia'-style platform where stakeholders can contribute their knowledge

# Appendix

# Appendix 1 – Glossary of terms

## Glossary of terms

### Abbreviations

COGS	Cost of goods sold
EICC	Electronics Industry Citizenship Coalition
EPA	Entry point assessment
Hr	Hour
HR	Human resources
IDH	Initiatief Duurzame Handel / Sustainable Trade Initiative
ILO	International Labour Organization
KPI	Key performance indicator
N/A	Not applicable or Not available
NGO	Non-governmental organization
OHS	Occupational health and safety
PRD	Pearl River Delta
RMB	Renminbi
UPPH	Units per worker per hour
WMD	Worker-management dialogue

# Appendix 2 – Evidence

## Summary of Secondary Hypotheses

Hypothesis / Intervention		Literature <sup>(1)</sup>		Suppliers <sup>(2)</sup>		Data <sup>(3)</sup>		Overall	
		Data points	Quantifiable	Data points	Quantifiable	Data points	Quantifiable	Strength of evidence	Quantifiability
Core	Turnover	4	0	6	1	1	0		
	Worker engagement	1	0	1	0	1	0		
	Overtime	1	0	7	0	3	0		
Secondary	Performance-based pay	3	1	5	0	0	0		
	Total pay	5	0	4	0	1	0		
	Worker representation	2	0	1	0	0	0		
	Physical conditions	1	0	5	2	1	0		
	Training/education	6	0	4	0	0	0		
	Worker-management dialogue	6	4	2	0	0	0		
	HR practices	1	1	0	0	0	0		
	Operational efficiency <sup>(4)</sup>	0	0	2	2	0	0		

(1) Indicates number of papers with supporting evidence (showed a correlation) or quantifiable evidence of the hypothesis

(2) Indicates number of relationships specified by suppliers (e.g. Total pay improves productivity and reduces turnover counts as 2 relationships)

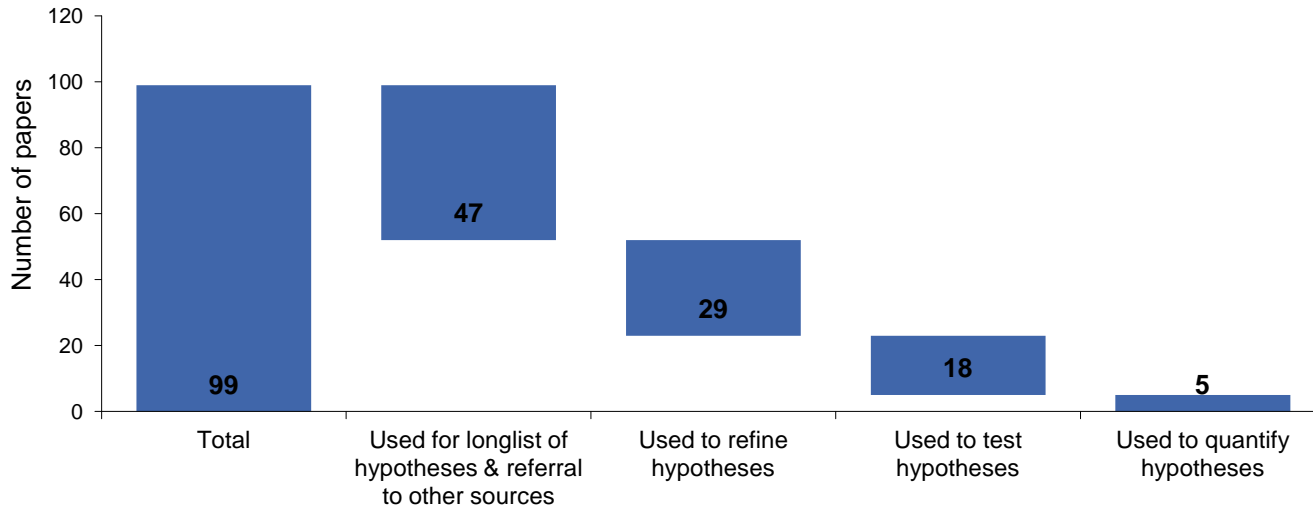
(3) Indicates the number of relationships found during data analysis

(4) This intervention was not part of the literature review as they were added following supplier interviews

<b>Key</b>	<b>Strength:</b>	<b>Quantifiability:</b>
	>6 data points	> 1 relationship
	4-6 data points	= 1 relationship
	<4 data points	no relationship

# Appendix 2 – Evidence Literature

Literature review results – papers used in each step



## Comments

- All 99 papers reviewed were useful but deriving quantifiable relationships from them was challenging
- The aim was to find papers with the following criteria: Chinese/Asian or manufacturing context, academic/peer-reviewed, <10 years old, analysing relationships between interventions & outcomes; not all papers met this criteria
- 29 papers described interventions and were used to refine our hypotheses, but these papers either did not explore the relationships between the interventions and the outcomes, were qualitative or could not find significant relationships in the data analysis
- 18 papers provided evidence of relationships by means of correlations between variables and/or regression analyses. However, many did either not carry out regression analysis or did not report relevant units and thus could not be used directly for the model
- 3 academic papers and 2 case studies showed quantifiable relationships between variables of interest and included useable units. These were used to quantify hypotheses in the model

# Appendix 2 – Evidence Literature

## Literature used for each hypothesis

Hypothesis / Intervention	Paper	Comments	
Core	Turnover	Hatch, 2004; Knolle, 2010; Koys, 2001; Park, 2013	No regression
	Worker engagement	Birdi, 2008	No relevant units
	Overtime	Shepard, 2000	No regression
Secondary	Performance-based pay	Waldman, 2012 Hurst, 2005; Ramboll, 2010	Quantifiable Useful case studies
	Total pay	Hurst, 1995; Ramboll, 2010 Griffeth, 2000 Khatri, 2001; Misra, N/A	Useful case studies No regression No relevant units
	Worker representation	Hurst, 1995; Ramboll, 2010	Useful case studies
	Physical conditions	Cottini, 2011	No relevant units
	Training/education	Hurst, 1995; Ramboll, 2010 Akhtar, 2008; Birdi, 2008; Huselid, 1995; Zheng, 2009	Useful case studies No relevant units
	Worker-management dialogue	Cottini, 2011; Waldman, 2012 Hurst, 2005; Ramboll, 2010 Akhtar, 2008; Bae, 2000 Knolle, 2012	Quantifiable Useful case studies No relevant units No regression model
	HR practices	Huselid, 1995	Quantifiable
	Health & Safety	N/A	N/A
	Operational efficiency	N/A	N/A

## Comments

- No regression indicates that no regression analysis was done in the publication or that regression slopes were not published in a useable form
- No relevant units indicates that either the units were not provided, they were not useful for our analysis or that the variables themselves were not useful
- Useful case studies and quantifiable papers were used for the model

# Appendix 2 – Evidence Supplier interviews

## Overview of evidence gathered through interviews with suppliers

Hypothesis	Support data points	Quantifiability	Observations
Turnover			<ul style="list-style-type: none"> <li>Interviews with suppliers indicated that there is a relationship between turnover and productivity</li> <li>Performance-based pay was seen as the most promising intervention to reduce turnover</li> <li>One supplier stated that productivity for new workers is 20% less and rework is double that of more experienced workers. We model a 0.03% increase in UPPH and a 0.13% decrease in rework for every percentage decrease in turnover</li> </ul>
Worker engagement			<ul style="list-style-type: none"> <li>Only one supplier recognised a relationship between worker engagement and productivity but was unable to quantify the relationship</li> <li>Performance-based pay was seen as the most promising intervention to improve worker engagement</li> </ul>
Overtime			<ul style="list-style-type: none"> <li>Suppliers recognised that overtime can have an adverse impact on productivity</li> <li>However, they also indicated that reducing overtime too much would result in an increase in turnover, as 40%-60% of workers' pay consists of overtime payments</li> <li>Performance-based and total pay were seen as the most promising interventions to reduce overtime</li> </ul>
Secondary hypotheses			<ul style="list-style-type: none"> <li>Costs are indicated to be the biggest barrier to improving working conditions, followed by over-ambitious ordering by brands</li> <li>Suppliers confirmed many of the hypothesised relationships but were unable to quantify these</li> <li>Relationships for which figures were provided are:               <ul style="list-style-type: none"> <li>Physical conditions (air conditioning + installing heat shield) vs rework rate</li> <li>Physical conditions (hiring ergonomics specialists) vs absenteeism</li> <li>The effect of Lean manufacturing diagnostic resulting in tooling and process improvements</li> </ul> </li> </ul>

## Comments









- Interviews with suppliers resulted in a number of quantified relationships between hypothesised interventions and productivity
- The costs of interventions and the over-ambitious ordering by brands were seen as the key barriers to improving working conditions
- Attracting / retaining (better) workers was seen as the key benefit of investing in working conditions
- Performance-based pay is seen as the most promising intervention to reduce turnover, increase worker engagement, and reduce overtime

### Key

Support:		Quantifiability:	
>2 cases		> 1 relationship	
1-2 cases		= 1 relationship	
0 cases		no relationship	

# Appendix 2 – Evidence Data analysis







## Overview of evidence gathered through data analysis

Hypothesis	Support data points	Quantifiability	Observations
Turnover			<ul style="list-style-type: none"> <li>Overall, analysis of factory KPI data (both the IDH KPI data and KPI data from 23 apparel factories) suggests that turnover has a positive impact on productivity (UPPH and rework), which may be explained by two coinciding effects: i. turnover goes up as production levels are pushed up; ii. workers are made to work harder when production levels are pushed up</li> <li>This relationship is confirmed by correlating the turnover variables against the productivity variables, as well as through analyses that search the data for rules (Random Forest and M5 Pruned Model)</li> <li>Increases in turnover and/or the share of new workers do show a decrease in productivity at a selection of individual factories, however these findings are not statistically significant</li> </ul>
Worker engagement			<ul style="list-style-type: none"> <li>Analysis (Random Forest) of the IDH worker survey data shows that the combination score for 'Contentment' is a strong predictor for rework, however a quantifiable relationships with a reasonable degree of accuracy can only be derived through the application of a multitude of rules covering multiple variables</li> </ul>
Overtime			<ul style="list-style-type: none"> <li>Overall, analysis of factory KPI data (both the IDH KPI data and KPI data from 23 apparel factories) suggests that overtime has a negative impact on productivity (UPPH and rework)</li> <li>Analysis of the IDH KPIs shows a statistically significant relationship between hours worked and rework rate (<math>p &lt; 0.05</math>), however the R-value is very low and the relationship does not meet the tests for a linear equation through regression analysis</li> <li>Analysis of the apparel factory data shows a statistically significant (<math>p &lt; 0.05</math>) relationship between the % of workers working less than 60 hours and rework rate, but the relationship does not meet the tests for a linear equation</li> <li>Analysis of the IDH worker survey data (Random Forest) shows that peak days worked is a strong predictor for overtime, however a quantifiable relationships with a reasonable degree of accuracy can only be derived through the application of a multitude of rules covering multiple variables (at least 34 rules), thereby preventing a simple linear relationship</li> </ul>
Secondary hypotheses			<ul style="list-style-type: none"> <li>Analysis of the worker survey data suggests that salary and the combination score for physical conditions are strong predictors for rework, but as with worker engagement it is not possible to derive a quantifiable relationship</li> </ul>

## Comments

- Data analysis suggests that decreasing overtime results in improved productivity, however, it is not possible to quantify this relationship with the data available
- Turnover appears to have a relationship to productivity opposite to our hypothesis, namely that turnover increases coincide with improved profitability, which may be explained through an 'efficiency effect' that occurs when factories ramp up production (and a higher percentage of workers come and go)
- It has not been possible to find strong evidence or a quantifiable relationship for worker engagement or our secondary hypotheses
- There are strict criteria for using a data set to show a linear relationship between two variables:
  - The relationships should be significant (p-value)
  - The correlation coefficient should be high (R-value)
  - The relationship needs to meet 4 tests to support the assumption of a linear relationship

### Key

Support:		Quantifiability:	
>2 cases		> 1 relationship	
1-2 cases		= 1 relationship	
0 cases		no relationship	



## Appendix 2 – Evidence Datapoints used (1/3)

Hypothesis	Intervention	Impact		Cost	
		Impact modelled	Datapoints / assumptions	Cost per worker modelled	Datapoints / assumptions
<b>Individual interventions</b>					
Performance pay example	Introduce performance-based pay / bonus system	Decrease turnover by 36%	Regression analysis shows that turnover decreases by 12% for each increase in score on performance pay on a 5 point scale (Waldman, 2012) Assume introduction of performance pay increases score by 3 points	Recurring: RMB 273	Supplier estimates of cost of introducing performance pay are 400, 344 and 74 per worker per month (Supplier #1; Supplier #2; Supplier #3)
Physical conditions example 1	Improve comfort in factory through heat-shield and airconditioning	Decrease rework rate by 65%	Supplier interview: reduced rework from 10,000 PPM to 3,500 PPM (Supplier #3)	One-off: RMB 900	Cost estimates provided for installation of heat shield and airconditioning (Supplier #2; Supplier #3)
Physical conditions example 2	Hire ergonomics specialists to prevent absenteeism resulting from sickness and doctor visits	Decrease absenteeism 53%	Supplier interview: reduced absenteeism from 4.75% to 2.25% (Supplier #4)	Recurring: RMB 14	Average salary of ergonomics specialist RMB 6,802 (Classified Post, 2011) Four ergonomics specialists for 2,000 workers (Supplier #4)
Operational efficiency example	Perform intensive / focused Lean manufacturing diagnostic	Increase productivity (UPPH) by 10%	Supplier interview: improved tooling resulted in 20% productivity improvement and process optimisation resulted in 20% decrease in number of workers needed (Supplier #3)	One-off: RMB 277	30 days of a 5 person Lean team working with 10 managers Weighted average daily cost of a Lean team member of RMB 2443 (Gemini, 2013; 5% Lean Director; 25% Lean Manager; 70% Black Belt Process Improvement) Weighted average wage of factory manager of RMB 12,500

Please note: these example interventions are illustrative and are **not** intended to be **representative** of the interventions done in the context of the IDH Programme

## Appendix 2 – Evidence Datapoints used (2/3)

Hypothesis	Intervention	Impact		Cost	
		Impact modelled	Datapoints / assumptions	Cost per worker modelled	Datapoints / assumptions
<b>Packages of interventions</b>					
Improved HR practices example 1	Package of HR practices incl better recruitment, formal training, better information, performance appraisal	Reduce turnover by 40%	Regression analysis shows that introducing a package of HR interventions (employee skills and organisation structures and employee motivation) reduces turnover by 40% (Huselid, 1995)	Recurring: RMB 70	Increase HR budget per worker by 30% Increase ratio of HR staff to workers by 50% Estimated HR budget per worker of RMB 2,500 Estimated HR-staff ratio of 1:500 Weighed average wage of HR staff of RMB 7,678 (20% HR manager, 20% in-house recruitment manager, 60% HR officer) (Classified Post, 2011)
Improved HR practices example 2	Improve relationship between workers and supervisors by increasing the ratio of supervisors to workers and investing in HR staff to facilitate better worker-supervisor relations (e.g. better appraisal system)	Decrease turnover by 25%	Regression analysis shows that a strong relationship between worker and supervisor/manager (leader-member exchange) reduces turnover by 9.4% for every point increase in score on a 7 point scale; a 4 point improvement as a result of described actions would result in a 38% decrease in turnover (Waldman, 2012) Regression analysis shows that a 'bad boss' increases turnover by 25% (Cottini, 2011)	Recurring: RMB 58	Increase ratio of supervisors to workers by 30% Increase ratio of HR staff to workers by 50% Supervisors-staff ratio of 1:30 Weighted average wage of supervisors of RMB 5,000 Estimated HR-staff ratio of 1:500 Weighed average wage of HR staff of RMB 7,678 (20% HR manager, 20% in-house recruitment manager, 60% HR officer) (Classified Post, 2011)

Please note: these example interventions are illustrative and are **not** intended to be **representative** of the interventions done in the context of the IDH Programme

## Appendix 2 – Evidence Datapoints used (3/3)

Hypothesis	Intervention	Impact		Cost	
		Impact modelled	Datapoints / assumptions	Cost per worker modelled	Datapoints / assumptions
<b>Packages of interventions</b>					
Worker engagement example	Package of interventions including training of management on worker engagement, promoting worker voice and worker involvement, improving worker welfare	Decrease turnover by 36% Increase productivity (UPPH) by 10% Decrease rework rate by 10%	Case studies show that working with manufacturers to introduce WMD and investing in a range of high-priority working conditions issues can affect performance (Hurst, 2005; Ramboll, 2010): - Turnover decrease by 5% - >50% - Productivity increase by 5%-30% - Rework rate decrease by 2%-25% Turnover decrease is taken from 'performance-based pay' (see above), and for UPPH and rework, conservative estimates are used	Recurring: RMB 280 One-off: RMB 647	Training cost: 30 days training at RMB 4,000 per day involving 10 managers and 10 workers with weighted average monthly pay of RMB 7,150 (assumes managers and workers are paid for training time) Worker involvement through committees (welfare committee, OHS committee, etc): 10% of workers spend 1 day per month paid time on committees OHS training: 3 days of training per worker per year of paid time Install airconditioning in dorms: RMB 480 per worker (Supplier #3) Performance pay: RMB 273 per worker per month (see 'performance pay' above)

Please note: these example interventions are illustrative and are **not** intended to be **representative** of the interventions done in the context of the IDH Programme

## Appendix 3 – Methodology

# Overview of approach and mental model (1/2)

### Observations

- |                 |   |
|-----------------|---|
| Business case   | <ul style="list-style-type: none"><li>• The objective of our research has been to assess whether interventions to improve working conditions result in a 'positive business case' for electronics suppliers</li><li>• The business case is calculated using a custom-built Excel model, in which the profit model of an archetypical electronics supplier has been simulated and the underlying profit drivers are adjusted based on the intervention that is being simulated</li><li>• A positive business case is achieved when the cost savings effectuated by a particular intervention or package of interventions outweigh the costs of the intervention(s) over time</li><li>• As the circumstances at each supplier are different (see also 'Influencing factors'), the effects of interventions will vary by supplier; as such the business case should be viewed as indicative and instructive for the required magnitude of the potential effect of the intervention and the associated cost to yield a positive business case ( 'What you need to believe')</li><li>• 'Sensitivity analysis' is performed to assess to what extent a decrease in the strength of the effect or the cost of the intervention (e.g. turnover is reduced by less than assumed) still yields a positive business case</li></ul> |
| Core hypotheses | <ul style="list-style-type: none"><li>• Our approach has been to develop a range of hypotheses to be tested through research and analysis</li><li>• Our core hypotheses relate to a range of productivity drivers that we presume to have a positive impact on competitiveness</li><li>• Our quantitative analysis has been limited to a subset of the components of competitiveness: worker productivity (pieces per worker per hour), rework rates, absenteeism and the direct cost of turnover (recruitment and training costs)</li><li>• Reducing turnover and overtime are presumed to improve worker productivity, reduce rework rates, and reduce the direct cost of turnover, while worker engagement is presumed to improve worker productivity, reduce rework rates and reduce absenteeism</li><li>• The core hypotheses have been tested through a combination of literature review, data analysis and an interview programme</li></ul>  |

## Appendix 3 – Methodology

# Overview of approach and mental model (2/2)

### Observations

#### Secondary hypotheses

- Our secondary hypotheses relate to a range of interventions that suppliers can take that would have the combined effect of improving working conditions and impacting positively on the productivity drivers
- These hypotheses have been generated based on a review of the literature, and the combined experiences of IDH and INFACT
- We have investigated these hypotheses through a combination of literature review, data analysis and an interview programme, where we have sought to identify *quantifiable* relationships between interventions (or packages of interventions) taken and the variables that drive a supplier's productivity
- Interventions may impact productivity indirectly through the productivity drivers (i.e. turnover) or may directly influence productivity
- These relationships have been triangulated to derive figures for both the costs and the effect of the interventions, which have been fed into our Excel model

#### Impact

- Our research has not sought to assess the impact, positive or negative, on working conditions resulting from the interventions
- We make an implicit assumption that interventions like increasing pay, improving physical conditions or involving workers in worker-management dialogue improves working conditions, but have made no analysis of the relative merit of one intervention over another

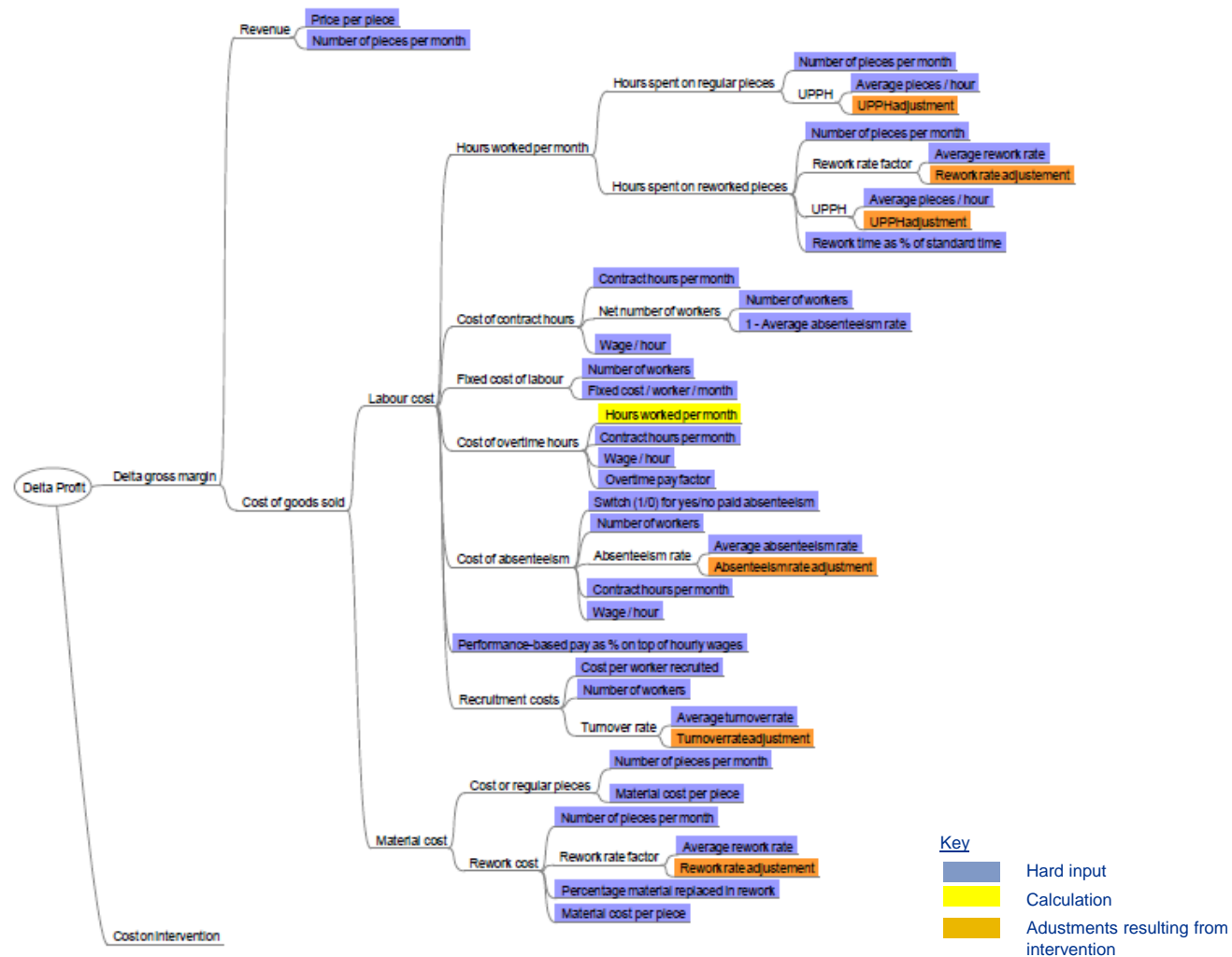
#### Influencing factors

- We are aware that the impact of the interventions that we are simulating may vary strongly based on supplier factory characteristics and/or exogenous factors
- Examples of factory characteristics include the complexity of production, the skill level required of workers, and the starting point of the factory (initial level of overtime, initial level of rework, etc)
- Examples of exogenous factors include labour market competition, the terms and conditions set by brands placing orders as well as law enforcement on labour conditions
- Where possible we have focused our research on literature describing suppliers that are as similar as possible to the suppliers involved in the IDH Programme, however even these suppliers vary strongly among themselves, and the lack of available evidence in the literature has spurred us to consider literature that describes suppliers that may be in other industries and/or countries
- We did not correct for exogenous factors in our research

# Appendix 3 – Methodology

## Profit tree

### Detailed profit tree



### Comments

- Key assumptions used in the model are outlined below
- Workers are paid an hourly wage, rather than per unit produced
- Production levels are constant
- Gross margin is ca 12%, with wages accounting for 5% of Cost of Goods Sold and material costs for the remainder
- Basic monthly wage levels are RMB 1400, and a fixed cost of RMB 450 for housing allowances and social insurance is additionally modeled
- Reworked pieces take 150% of time of a regular piece
- In rework, 10% of material has to be replaced (by value)
- Hours lost due to absenteeism are not paid
- Interventions are assumed to have a delayed effect of 2 months, except for the comprehensive HR/worker-management dialogue packages which are assumed to have a 6 month lag time
- Costs and benefits are taken as nominal cash value in order to calculate a straight-forward pay-back period and not discounted to present value, which is deemed to be a relevant measure for operations directors of electronics suppliers in the Pearl River Delta

## Appendix 4 – Sources Literature (1/4)

List of literature		
Author	Title	Date
Akhtar, S. et al.	Strategic HRM Practices and their Impact on Company Performance in Chinese Enterprises	2008
Al Smadi, S.	Kaizen strategy and the drive for competitiveness: challenges and opportunities	2009
Ali, S.I. et al.	Evaluation of performance in manufacturing organization through productivity and quality	2011
Arthur J.B.	Effects of Human Resource Systems on Manufacturing Performance and Turnover	1994
Bae, J. et al.	Organizational and HRM Strategies in Korea: Impact on Firm Performance in an Emerging Economy	2000
Barrientos, S. et al.	Capturing the Gains: Economic and social upgrading in global production networks	2010
Berry, M.L.	Predicting turnover intent: Examining the effects of employee engagement, compensation fairness, job satisfaction, and age	2010
Better Work	Workers, Businesses and Government: Understanding labour compliance in global supply chains	2011
Birdi, K.	The impact of human resource and operational management practices on company productivity: A longitudinal study	2008
Bosch, G. et al.	Working time reduction and employment: experiences in Europe and economic policy recommendations	2001
Boyce, A.S. et al.	Temporary Worker, Permanent Loser? A model of the stigmatization of temporary workers	2007
Burton, J.	The Business Case for a Healthy Workplace	2008
Chan, C.K.	Class struggle in China: Case studies of migrant worker strikes in the Pearl River Delta	2010
Chan, C.K.	The challenge of labor in China: Strikes and the changing labor regime in global factories	2011
Chan, C.K. et al.	The making of a new working class? A study of collective actions of migrant workers in South China	2009
Cheung, C. et al.	Work commitment among unemployed youth in Hong Kong, Shanghai and Tianjin	2012
Chin, K. et al.	A proposed framework for implementing TQM in Chinese organizations	2002
Chow, I.H.S. et al.	The effect of aligning organizational culture and business strategy with HR systems on firm performance in Chinese enterprises	2009
Chow, I.H.S. et al.	Strategic HRM in China: Configurations and competitive advantage	2008
Classified Post	Salary Index Hong Kong	2011
Cottini, E. et al.	Adverse workplace conditions, high-involvement work practices and labour turnover: evidence from Danish linked employer-employee data	2011
De Gobbi, M.S.	Gender and the environment: A survey in the manufacturing of machine-parts sector in Indonesia and China	2012
De Greef, M. et al.	Quality of the working environment and productivity	2004
Dexter, R.	Why China's factoris are turning to temp workers	2012
EICC	Understanding Employee Health & Welfare Issues in China	2012
EICC	Annual Report	2011
EICC	A practical approach to greening the electronics supply chain	2011
Ergon Associates	Better Work: Electronics Feasibility Study Executive Summary	2010

*Continued on next page*

## Appendix 4 – Sources Literature (2/4)

List of literature		
Author	Title	Date
Fair Labour Association	Independent External Monitoring Report: SanMar	2008
Farris, J.A. et al.	Critical success factors for human resource outcomes in Kaizen events: An empirical study	2009
Folgo, E.J.	Accelerating Time-to-Market in the Global Electronics Industry	2008
Frenkel, S.J. et al.	Management, Organizational Justice and Emotional Exhaustion among Chinese Migrant Workers: Evidence from two Manufacturing Firms	2012
Galang, M.C.	The transferability question: Comparing HRM practices in the Philippines with the U.S. and Canada	2004
Gallagher, M.E.	Written statement for the congressional executive commission hearing on working conditions and worker rights in China: Recent developments	2012
Gemini Personnel	Guide to China Market Salaries 1st Quarter	2013
Griffeth, R.W. et al.	A meta-analysis of antecedents and correlates of employee turnover: update, moderator tests, and research implications for the next millennium	2000
Harter, J.K. et al.	Q12 Meta-Analysis: The relationship between engagement at work and organizational outcomes	2009
Harter, J.K. et al.	Causal impact of employee work perceptions on the bottom line of organizations	2010
Harter, J.K. et al.	Well-being in the workplace and its relationship to business outcomes: A review of the Gallup studies	2003
Hatch, N.W. et al.	Human capital and learning as a source of sustainable competitive advantage	2004
Hay Group	Engage Employees and Boost Performance	2001
Herron, C. et al.	A methodology for developing sustainable quantifiable productivity improvement in manufacturing companies	2006
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Hurst, R. et al.	Nice Work: Are workers taking the strain in the economic downturn?	2012
Huselid, M.	The Impact of human resource management practices on turnover, productivity and corporate financial performance	1995
Ichniowski, C. et al.	What works at work: Overview and assessment	1996
ILO	Labour and Social Trends in ASEAN 2008: Driving Competitiveness and Prosperity with Decent Work	2008
ILO	Working Time Around the World: Trends in working hours, laws and policies in a global comparative perspective	2007
ILO	Better work Indonesia: garment industry baseline report : worker perspectives from the factory and beyond	2012
ILO	Better work Lesotho: garment industry baseline report	2012
ILO	Better work Vietnam: garment industry baseline report : worker perspectives from the factory and beyond	2012
ILO	Retrogression in working conditions: evidence from Better Factories Cambodia	2012
ILO	Corporate social responsibility and the worker stakeholder: Lesotho clothing worker's perceptions of what makes better work	2012
ILO	Working conditions and factory survival: evidence from Better Factories Cambodia	2011
IMF / Das, M. et al.	Chronicle of a decline foretold: Has China reached the Lewis Turning Point?	2013
Jiang, B. et al.	An analysis of job dissatisfaction and turnover to reduce global supply chain risk: Evidence from China	2009

*Continued on next page*



## Appendix 4 – Sources Literature (3/4)

List of literature		
Author	Title	Date
Kathkar, G.	Methods to improve productivity in manufacturing industry (Case study of Bjaja Auto Ltd. & Lean manufacturing of Toyota Ltd.)	2012
Kepeng, Z.	Firm turnover and productivity growth in China's manufacturing industries	N/A
Khatri, N.	Managing human resource for competitive advantage: a study of companies in Singapore	2000
Khatri, N. et al.	Explaining employee turnover in an Asian context	2001
Kishimoto, C.	Working Paper: Profitability in Taiwan's electronics manufacturing services' firms: A comparison with American Firms	2005
Knolle, M.	Influence of participatory organization structures on the implementation of social standards: An empirical study of Chinese garment factories	2012
Koys, D.J.	Organizational citizenship behavior, and turnover on organizational effectiveness: a unit-level, longitudinal study	2001
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Ma, M. et al.	From Words to Action: A Business Case for Implementing Workplace Standards – Experiences from Key Emerging Markets	2009
Manpower China	White Paper: The China Talent Paradox	2006
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Mercer	China Corporate Benchmark Monitor	2005
Mishra, V. et al.	Work hours in Chinese enterprises: Evidence from match employer-employee data	2012
Neagoe, L.N. et al.	Employee suggestion system (Kaizen Teian), the bottom-up approach for productivity improvement	2009
Ngai, P.	The role of the State, labour policy, and migrant worker's struggles in globalized China	2010
Oka, C.	Does Better Labour Standard Compliance Pay?	2012
O'Rourke, D. et al.	Experiments in transforming the global workplace: Incentives for and impediments to improving workplace conditions in China	2003
Park, T.Y. et al.	Turnover rates and organization performance: a meta analysis	2013
Pfeffer, J.	Competitive Advantage Through People	1994
Plambeck, E. et al.	Improving Environmental Performance in Your Chinese Supply Chain	2012
Ramboll	Impact Assessment of the Public Private Partnership of GTZ & Tchibo – WE Project	2010
Record, R. et al.	Labour practices and productivity in the Lao garments sector: Perspectives from managers and workers	2012
Reis, F. et al.	Japanese management and salary productivity: the case of the electronic and automotive industries in Portugal	2012
SAI & IFC	Measure & Improve Your Labour Standards Performance	N/A

*Continued on next page*

## Appendix 4 – Sources Literature (4/4)

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Author	Title	Date
Schaufeli, W.B. et al.	Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study	2004
Seo, J.	Excessive Overtime, Workers & Productivity: Evidence and Implications for Better Work	2011
Shaw, J.	Turnover rates and organization performance: Review, critique, and research agenda	2011
Sheldon, P. et al.	Localized poaching and skills shortages of manufacturing employees among MNEs in China	2012
Shepard, E. et al.	Are longer hours reducing productivity in manufacturing?	2000
Shkolnikov, A. et al.	The business case for corporate citizenship	2004
Singh, J. et al.	Kaizen Philosophy: A review of literature	2009
Sumukadas, N.	Employee involvement: a hierarchical conceptualisation of its effect on quality	2006
Tan, J.T. et al.	Environment-Strategy relationship and its performance implications: An empirical study of the Chinese Electronics Industry	1994
Tanchuang, P. et al.	Quality of Working Life: A Case of Workers in an Electronic Factory	N/A
Towers Perrin	Winning strategies for a global workforce: Attracting, retaining and engaging employees for competitive advantage	2005
Van Heerden, A.	FLA investigation of Foxconn in China	2012
Waldman, D.A., et al.	A multilevel investigation of leadership and turnover behavior	2012
Welford, R. et al.	Corporate Social Responsibility in Asian Supply Chain	2006
Zheng, C.	Keeping talents for advancing service firms in Asia. Journal of Service Management	2009
Zheng, C. et al.	Organizational determinants of employee turnover for multinational companies in Asia	2010

# Appendix 4 – Sources

## Interview programme and datasets

### Interview programme

ILO - SCORE programme  
Impactt – Overtime project  
Apple  
Dell  
HP  
Philips  
INFACT  
Economics Rights Institute  
Supplier #1 (Shenzhen area, ~6000 workers)  
Supplier #2 (Dongguan area, ~1500 workers)  
Supplier #3 (Dongguan area, ~1250 workers)  
Supplier #4 (Sao Paulo area, ~500 workers)

### Datasets

IDH programme participants – Data on 15 monthly KPIs from 10 factories  
IDH programme participants – Worker survey results from 20 factories  
Data on 91 KPIs from 47 China-based manufacturers



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